—THE—

Therapeutic Gazette.

Whole Series, Vol. XV. | DETROIT, MICH., PHILADELPHIA, PA., | February 16, 1891. | Third Series, Vol. VII. No. 2.

CONTENTS.

Original Communications.

	Page
New Therapeutic Agencies. By Professor Dujardin-Beaumetz	73
Treatment of Meningitis. By James Barr, M.D.	80
Chronic Urethritis. By L. Bolton Bangs, M.D.	89
Carbolate of Camphor. By M. B. Cochran, M.D.	93
Intestinal Pills. By Wm. H. Flint, M.D.	94
Cupric Arsenite in the Treatment of Lienteric Diarrhœa. By A. F. Hinz, M.D.	97
Dr. Koch's Remedy. By Karl von Ruck, B.S., M.D.	98

Leading Articles.

The Use of Stimulants in Fevers	100
Saburral Fever and its Treatment	101
Chloralantipyrin	102
Koch's Remedy for Tuberculosis	103
A So-called Eucalyptus Honey	104

Reports on Therapeutic Progress.

Treatment of Syphilis by Means of Intramuscular Injections of Thymol of Mercury	99
Therapeutic Principles governing the Selection of Cardiac Medicaments	104
Hypnotic Action of Atropine and Duboisine	115
The Action of Somnal	116
Treatment of Chorea by Exalgin	116
An Improvement in Internal Phlebotomy	117
Cardiac Remedies	118
The Value of Hydronaphthol as an Antiseptic	118
The Treatment of Myxœdema by Thyroid Grafts	119
Wet Antiseptic Dressings in Injuries of the Hand	120
The Course and Treatment of Purulent Pleuritic Effusions	120
The Indications for Operation in Ectopic Gestation	121
The Rôle of the Lymphatic Cells in Protection of the Organism against Infection of Bacilli	122
The Bromide of Ethyl Narcosis	123
The Action of Strontium and its Salts	124
"Uratosis," or the Deposition of Crystalline Urates in the Tissues	124
The Prognostic Value of the Number of Respirations in Pulmonary Affections	126
Treatment of Hysterical Fits	126
Treatment of Convulsions in Children	127
A Non-Poisonous, Non-Irritative Antiseptic Dressing	128
The Action of Koch's Remedy on Internal Organs in Tuberculosis	129
The Composition of Professor Koch's Remedy for Tuberculosis	132
Reviews	135

Correspondence.

Paris Letter	137

Notes and Queries.

An Experimental Criticism of our Knowledge of the Action of Cocaine	140
Ehrlich's Test in Typhoid Fever	141
Styrone in Otitis Media	143
Cocoa-Nut as a Tænicide	143
Addison's Disease and the Pararenal Glands	143
The Effect of Age on the Absorption of Drugs	143
The Therapeutic Action of Chloroform incorporated in Ointment	144
To remove the Pigmentations of Pregnancy	144

Original Communications.

*NEW THERAPEUTIC AGENCIES.**

LECTURE X.—SUGGESTION IN THERAPEUTICS.†

By Professor Dujardin-Beaumetz,‡ Paris, France.

GENTLEMEN:—I have long hesitated to approach the subject which I am to speak of to-day, and it is only in response to your urgent request that I now take up this burning question of hypnotic suggestion in therapeutics.

This subject, in fact, brings up such knotty scientific, physiological, and even religious problems, it touches upon the marvellous in so many points, that it is very difficult, in dealing with it, to place one's self on a solid and truly scientific basis, as far removed from scepticism as from an irrational partisan enthusiasm.

The marvellous and the mysterious have always had on man a preponderant influence, and when Quatrefages attributed to the human species religiosity as a characteristic, he meant to include that belief in the supernatural which dominates the thoughts of

* A second series of "New Medications," published in 1887.

† From advance sheets, revised by the author (translated by E. P. Hurd, M.D.). Lectures delivered in Cochin Hospital, Paris, France.

‡ Member of the Academy of Medicine, Physician to the Cochin Hospital, Paris, France.

man, whatever may be his race or habitation.

A voluminous and very interesting work might be written on the history of the marvellous in the sciences, and, in particular, in medicine. Without here describing all the phases through which has passed this question of suggestion, I can assure you, nevertheless, that in the earliest ages medicine among all nations was based largely on suggestion. In India, the cradle of the Indo-European races, hypnotism was the foundation not only of religion but of the primitive therapeutics of that people. Those bloody festivals where the Hindoo devotee is broken under the wheels of the car of the god which he worships, those suppliants of Brahma who swing in the air suspended by cords which are thrust through their principal muscles, are instances of the power of hypnotic suggestion to animate, inspire, and support the victims of religious fanaticism.

In that same country, suggestion has taken on a particular characteristic, which constitutes a quite special branch of hypnotism. I refer to *spiritism*, to which Gibier has given the name of *occidental fakirism*,* to indicate its origin in the practices of the initiates of the sacerdotal caste,—the *yoguysts* and the *faquirs*. The faquir, in fact, is a charmer,—*i.e.*, a *suggester*,—and, as Jacolliot says, develops in the subjects who surround him phenomena of "magnetism and of somnambulism."

This spiritism, on which I shall not longer dwell, claims many distinguished and fervent believers, and we have seen Alfred Russel Wallace, who, simultaneously with Darwin, discovered the law of natural selection, and William Crooks, to whom we owe the discovery of thallium, devote themselves to the task of demonstrating by scientific experiments the reality of spiritualistic phenomena.

In Greece, in the primitive periods of history, the priests who served in the temples of Æsculapius, made great use of suggestion in the treatment of the sick; and since then, everywhere and in all places, suggestion has had a preponderant *rôle* in the history of medicine. Between the sorcerer, who still pursues his vocation of pretended healing in our villages, and his congener of Central Africa, there is no difference, and, when we compare their practices, we find them identical.

But let us leave to one side the prehistoric part of the question, as well as the thaumaturgists,—the expellers of demons; in a word, the miracle-workers and the adepts in the "black arts," who occupy so large a place in the history of the Middle Ages and of the Renaissance, and come down to a period when these practices take a more strictly scientific direction.

I say *direction*, for, do not forget, the suggestive practices are absolutely the same, and it is always the suggester who imposes his will, whether by touches, whether by word of mouth, whether by look; and if I were to read to you some passages from Van Helmont, from Paracelsus, from Robert Fludd, you would see that they all operate in the same way as do to-day Charcot, Luys, Bernheim, etc. You would see even Helimotius performing cures by *transferrence*, transmitting the disease from a man to an animal, or even to a tree, just as is to-day practised at the Charité the transfer of a malady from a sick to a well person. Writers, even in the ages of witchcraft, endeavored to take these phenomena out of the realm of the supernatural and of demonology and give them a scientific explanation.†

It was in the sixteenth century that the first serious attempt was made to account for these facts on scientific principles. Paracelsus pretended that there was in man a special magnetic influence, and he ascribed to magnetism (the word is his) certain phenomena akin to those with which we are now familiar, and for a long time this explanation (which really explains nothing) was accepted. From Paracelsus to Van Helmont, to Mesmer and his celebrated bucket, to Baron du Potet, and, still later, to Durville, his actual successor, this doctrine of animal magnetism has been held and taught by a great number of experts and believers.

But a physician of Manchester, James Braid, almost fifty years ago (in 1842), restated the whole question, and modified the current views on magnetism by showing that it was quite an easy matter, by fixing the attention on brilliant objects, to provoke an aggregate of phenomena, to which has been given the name of *hypnotism* or *Braidism*.‡

The facts mentioned by Braid remained long unknown,§ and, despite the communica-

* P. Gibier, "Le Spiritisme ou Fakirisme Occidental." Paris, 1887.

† Cullerre, "Magnetisme et Hypnotisme." Paris, 1886.

‡ James Braid, "Neurypnology, or the Rationale of Nervous Sleep, considered in Relation with Animal Magnetism." London, 1842.

§ Physiologists in this country and in Great Britain have been familiar with the facts and theories of

tions made from 1859 to 1865 by surgeons, who had employed this method to obtain anæsthesia, we have to come down to the communications of Lasègue in 1865, of Charles Richet in 1875, to the researches of Charcot in 1869, and, lastly, to the communications of Dumontpallier from 1881 to 1884, before we find this question of hypnotism and the phenomena which it causes seriously discussed.*

Charcot, in the communication which he made in February, 1882, to the Academy of Sciences, gave a classification of the divers nervous states determined in the hysterical by hypnotism, and under the name of *great hypnotism* he showed that in hysterical subjects it is possible to reduce to three types the various manifestations produced under the influence of hypnosis, and these three types are closely interconnected,—the cataleptic state, the lethargic state, and the somnambulic state.

While these experimental investigations were going on in the school of the Salpêtrière, the same phenomena were being studied by the Faculty of Nancy, under the influence of Professor Bernheim, one of those who have done the most to place hypnotism and suggestion on a scientific foundation. Bernheim has had an able predecessor in a physician of Nancy, Liébault, who published in 1866 a work which was almost unnoticed at the time, and had for its title, "Induced Sleep and the Analogous States." † Liébault maintained that it was quite possible by suggestion to provoke a particular state which was quite like sleep, and this might ensue under two different degrees,—light sleep and profound sleep.

There then arose between the two schools of Salpêtrière and of Nancy a dispute, which is far from being settled, and to the "*grand hypnotisme*" of the Salpêtrière is opposed the "*petit hypnotisme*" of Liébault and of Bernheim, the latter maintaining that the different phases described by Charcot and his pupils do not exist in reality, and that it suffices to excite in hypnotized patients the idea of the production of these phenomena to cause them to appear. In fact, to these physiologists these phases of the Salpêtrière school are simple phenomena of suggestion.

Lastly, our colleague Luys has quite recently applied to these phenomena another origin, which is removed from the pale of suggestion, and brought nearer to hypnotization as Braid understood it. He attributes them to *fascination*, such as may be produced by a brilliant object, as a faceted mirror, which is made to move rapidly before the eyes of the person whom it is intended to hypnotize.

Whatever may be the mode employed to induce this state, a series of phenomena is induced in certain patients, which may be summed up under three principal types, of which I will give you a rapid description.

There is, first, the *cataleptic* state. I need not describe to you catalepsy. You know that this state is characterized by immobility. The patient has a fixed stare, the eyes being turned in one direction, the countenance impassive, and you may impart to his limbs and to his body the strangest positions, and he will maintain them for a long time.

Lethargy, on the contrary, is, so to speak, the opposite of the cataleptic state. It is an absolute resolution of the limbs; there is a complete analgesia. The eyelids are closed, and the eyeballs turned upward and inward. In this stage there has been noticed a quite particular excitability of the spinal cord, to which Richet and Charcot have given the name of *neuro-muscular hyperexcitability;* in fact, under the least shock, a slight irritation, a whiff of the breath, one may cause contractures of the muscles thus influenced.

Lastly, comes the somnambulic period;

"Braidism," chiefly through the admirable exposition given by Dr. W. B. Carpenter in 1852, and later in successive editions of his "Human Physiology." The methods and results (psychological and physical) of "hypnotism" (the name originated with Braid) are very lucidly described by Carpenter, whose explanation of these phenomena, in accordance with known laws of mental and nervous physiology, has hardly been surpassed. Carpenter describes the hypnotic state under two principal phases: 1. A state of complete coma or perfect insensibility, analogous to the hysteric coma, and, like it, distinguished from the coma of cerebral oppression by a constant twinkling movement of the eyelids. 2. A state of artificial *somnambulism* or sleep-walking, which closely resembles natural somnambulism. This state is characterized by the facility with which the thoughts may be directed into any channel by the principle of "suggestion."—TRANS.

* Lasègue, "Études Médicales," t. i. p. 899, Paris, 1884. Ch. Richet, *Journal d'Anatomie et de Physiologie*, 1875; *Archives de Physiologie*, 1880; *Revue Philosophique*, 1880 and 1883; *L'Homme et l'Intelligence*, 1884. Charcot, *Progrès Médical*, *Gazette des Hôpitaux*, and *Gazette Médicale*, Paris, 1878. Dumontpallier, *Comptes-Rendus de la Société de Biologie*, 1881, 1882, 1883, and 1884. Bernheim, "De la Suggestion et de ses Applications à la Thérapeutique." Paris, 1886.

† Liébault, "Le Sommeil Provoqué et les États Analogues." Nancy, 1886.

this is the suggestive phase of hypnotism. Bernheim and Liébault admit six categories of hypnotization. In all, the will of operation is substituted for that of the hypnotized subject. In a first degree of this induced sleep there is somnolence, a feeling of heaviness, and the influence of suggestion is feeble, though sufficiently powerful to prevent, for instance, the patient from opening his eyes against the will of the operator. In the first and second degrees, the patient may be influenced from the point of view of automatic phenomena; then, in the other degrees, the patient is dominated entirely by suggestion, being now in relation altogether with the hypnotizer, who makes him execute movements, or suggests to him illusions and hallucinations.

I cannot enter into the detail of all the experiments of suggestion; you are familiar with them, and this state of suggestion may be produced in the waking state. Such, in their aggregate, are the phenomena which are developed, whether by suggestion, fascination, or hypnotism. The classification which I have given is absolutely theoretical, and the nervous phenomena may vary in their form and in their course in different subjects, and also in the same subject, where we often see the left side influenced differently from the right.

It remains for me to describe the manner of producing these phenomena before discussing the therapeutic value of suggestion. The modes of obtaining hypnosis, or the hypnotic state, are very varied, and you will find a description of them in the book of Bernheim.*

There are, first, the passes, once so much vaunted by the magnetizers, and which you will find described in all the special works, in particular in those of Deleuze, of Teste, of Noizet, and which are in use by the Hindoo magnetizers. Braid substituted for the passes by the magnetizers, the fixation of the eyes upon some one object, which might be a bright light, or simply the finger of the operator.

At the Salpêtrière school they employ almost anything which may excite one of the senses,—that of the hearing or sight; the sound of a gong determines the hypnotic state just as effectually as fixing the attention on a bright light; in a word, any intense sensorial impression may be employed.

Quite different is the method of producing hypnosis by suggestion; it is that employed by Liébault, Bernheim, and the school of Nancy. This method, it must be remembered, had already been applied as early as 1814 by Abbe Faria.

Abbe Faria was the first to reject the notion of a magnetic fluid, and to affirm that it was by suggestion or by volition that the operator produced sleep in hypnotized subjects; and you will permit me here to refer to the passage in which he explains his views, in his book on "Lucid Sleep."†

Faria fixed in one direction the eyes of the individual whom be desired to hypnotize, and made him look at the back of the hand raised before him; then he advanced a few steps, suddenly let fall the arm, ordering the subject to go to sleep. A similar method is employed by Liébault. "We make," he says, "the subject fix his eyes in one direction. We tell him to think of nothing but going to sleep and getting well. We announce to him the initial phenomena of sleep, the general torpor of the body, the felt desire for sleep, heaviness of the eyelids, insensibility. When we perceive that the eyelids tremble and grow heavy, that the eye takes on a vacant stare, that the pupil oscillates or dilates, we pronounce the charmed word, '*sleep!*'" Liébault adds that, if at the end of one minute, sleep does not ensue, the *séance* is postponed till another day.

The procedure of Bernheim is still easier. This is the way in which he describes his method: "The subject is supposed to be lying down or comfortably seated in an arm-chair. I allow him to remain quiet a few moments, simply saying that I am going to put him to sleep, and that his sleep will be tranquil. I gently bring my hand near his eyes, and say, 'Go to sleep.' Some shut their eyes instantly and are asleep; others, without closing the eyes, are taken with a fixed stare, and manifest all the phenomena of hypnosis. Others present certain trembling movements of the eyelids; the eyes open and shut alternately. In general, I do not allow the eyes to remain a long time open; if they do not close spontaneously, I keep them closed a short time, and if I meet with any resistance, I add, 'Stop; your lids are heavy, your limbs are benumbed, you are becoming drowsy; go to sleep.' It is rare that one or two minutes elapse without hypnosis super-

* Bernheim, "Hypnotisme, Suggestion," etc. Paris, 1891.

† Abbe Faria, "De la Cause du Sommeil Lucide." Paris, 1819.

vening. Some remain at first immovable and inert; others try to recover themselves, open their eyes, awake at each instant. I insist. I keep the eyelids shut, and I say, 'Keep on sleeping.'" *

In my own experience, when in my hospital service, I make use of hypnotism, it is by the fixation of the gaze, or by occlusion of the eyes, that I have produced sleep.

As for the awakening, this is obtained by various processes; the most ordinary consists in simply telling the patient to wake up, the voice being raised in a tone of command. Some attain the same end by blowing gently on the face of the hypnotized person.

And now that I have summed up as briefly as possible the phenomena provoked by hypnotism and the manner of producing it, let us examine the therapeutic value of this agency.

I shall not discuss here that aspect of the subject which concerns the actions of medicines at a distance on hypnotized subjects; this question seems to-day to be decided, and no one longer dares to maintain this action at a distance since the report which I presented to the Academy of Medicine in 1888 *à propos* of a communication made on this subject by Luys.†

The commission nominated by the Academy showed by a rigorous and scientific observation of the facts that there was no relation between the phenomena observed and the medicament of which usage was made. Here suggestion had everything to do with the result witnessed. It was because the operator, both in the case of the facts set forth by Bourru and those of Luys, indicated in a loud voice to the persons surrounding the patient what effects were going to follow such and such a substance, and that the patient would experience symptoms similar to those which he had heard described. And all that it was necessary to do was to keep the operator, his assistants, and the subject ignorant of the nature of the substance under experimentation to put in clear light the unreality of these effects of medicaments at a distance.

I pass now to a much more important question. What estimate should be put upon the results which may be obtained from suggestion in different pathological states?

To judge of the real value of this therapeutic agent, it is absolutely necessary to establish distinctions between the various patients who are made the subjects of hypnotic suggestion. We may in this regard establish three great classes. In the first, we will place the hysterical, whatever may be the form of this neurosis; in the second, we will put the neurasthenic, the unbalanced, the hypochondriacal; in a word, the nervous. The last category will contain all patients afflicted with organic affections with definite lesions, in whom the nervous element plays only a secondary *rôle*.

It is in the first group that suggestion or hypnosis has always produced its most positive effects. This group, as you know, is a very large one, for now that we understand better than ever before the manifestations of hysteria, thanks to the labors of Charcot and the school of Salpêtrière, we find that men even are often hysterical, and you see these cases of male hysteria quite frequently in our wards. Male hysteria is met with not only in the upper classes, but also among the common people, among the workingmen.

In this malady, whatever may be the mode which is employed to produce the hypnosis, —magnetism, suggestion, fascination,—the morbid manifestations are made to disappear, whatever may be their nature; and do not forget that these manifestations may take the form and the march of organic affections. Hysteria is the soil on which flourish most luxuriantly the pseudo-maladies. To gastric hysteria, so well described by my pupil Deniau, we may add pulmonary hysteria, which imitates phthisis, so as to deceive the unwary (see the numerous observations collected by my pupil Tostivint in his excellent thesis).‡

You easily understand how the symptoms of these pseudo-maladies may be removed in male and female hysterics by suggestion, just as the paralyses, the contractures, and other morbid manifestations of the neurosis may be made to disappear. I know of no better example to cite in this connection than that of a certain patient whom you have recently observed in our wards. This patient was a young man, about 30 years of age, who had for the third time been admitted for treatment. This hysterical subject presented gas-

* Bernheim, loc. cit., p. 89.

† Luys, "Action of Medicaments at a Distance" (*Acad. de Médecine*, 1887); Dujardin-Beaumetz, "Report on the Communication of M. Luys," February, 1888.

‡ Tostivint, "A Contribution to the Study of Pulmonary Hysteria" (*Thèse de Paris*, 1888).

tric and intestinal troubles absolutely simulating internal strangulation, and to such an extent that at Nantes the hospital staff was ready to perform lumbar colotomy; but the fear of this operation caused all his symptoms to cease. This last time he entered the hospital for attacks of hæmoptysis, which were rebellious to all treatment; but the threat of punctiform cauterizations produced speedy and complete quittance of all the pulmonary phenomena, for in these patients intimidation is a sort of suggestion.

In patients belonging to this category is suggestion always triumphant, and can we cause the element of pain to disappear at will in such subjects? Here, by the way, we enter a quite special department of our subject. I allude to the possibility of performing painful operations under the influence of anæsthesia by suggestion.

There is not the least doubt that in hysterical patients greatly susceptible to suggestion it is quite possible to banish sensibility and the notion of the external world to such a degree as to enable us to perform long and painful operations. My colleague and friend Mesnet, who has done not a little for the cause of rational hypnotism, and whose estimate is characterized by good judgment and lack of prejudice, has cited numerous convincing instances of operations performed without pain under the influence of hypnotism. It is the same with obstetrics. Mesnet, Auvard, and many others have reported cases of accouchement where the patient went through the pains of labor without conscious suffering, owing to the anæsthetic power of hypnotic suggestion.

But this action which hypnotism possesses on the sensibility has its limit, and this limit is determined by the pathological alteration of the part where the pain is produced; and while on this head, I will cite for you an example, also borrowed from our hospital service. The case is that of an hysterical woman, who has entered our wards for the fourth time. On the first occasions of her admission to the hospital she came in to be treated for contractures of the right inferior extremity. We practised "suggestions," but rather maladroitly, for instead of a unilateral contracture, she had a bilateral on awaking. Then one fine day all disappeared. She returns to-day with a sciatica, which is confined to the side on which she is totally anæsthetic. You may prick deeply the anæsthetic area, and she feels nothing; but this does not prevent her from suffering intense pain along the sciatic nerve, and here suggestion has been absolutely powerless to influence the pain.

It would be the same with a neuralgia caused by a carious tooth, or the severe pains provoked by cancer of the uterus, or even by ulcer of the stomach. On this point I part company with Bernheim, and while approving the spirit in which he has written his works, and, in particular, his "New Studies on Hypnotism," I cannot admit that the pain of the round ulcer is amenable to hypnotic treatment. That hysterical patients may experience manifestations similar to those which accompany *ulcus rotundum* I freely own, and in this case we should have to do with *pseudo-ulcers;* but when an hysterical person has a real ulcer, which destroys certain nerve-endings, we have here a lesion against which all the efforts of hypnotism will be powerless.

Let us now examine our second group, which is a large one, and comprehends a host of idle valetudinarians, of neurasthenics, of warped or nervously-broken unfortunates, of hypochondriacs, etc., who form, it must be remembered, a considerable part of the patients of the city. They consult all the doctors, all the quacks, the Christian scientists, and mediums, and the inconstancy which characterizes their ailments shows how little power suggestion has over them.

In these neuropathic patients the influence of the physician and the assurance with which he prescribes his remedies have more effect than the remedy itself. Here is the field of triumph of those granules variously colored, and over which certain medicasters make magnetic passes before administering them. Here, too, is the field of triumph of the ancient homœopaths. I say *ancient*, for to-day homœopathy, at least that kind which is professed by Jousset and his school, discards the infinitesimal doses, and no longer retains aught of the doctrine but the principle, *similia similibus;* but these men employ massive doses, just as we do.

Suggestion is also the motive principle of physicians who change the color of the paper of the sick-room, or of the shirts which the patient wears; but here such "suggestive therapeutics" are very often of but momentary efficacy, and after having derived some little benefit, the patient falls back into his old morbid ruts again, and gives himself up to some new doctor or quack without ever finding one who can completely rid him of the suffering which his morbid imagination at each instant engenders.

As for our third group, here it must be admitted that suggestion has but very little power, and is limited to the moral influence which the physician may have over the patient. This influence, it is true, belongs to the sphere of suggestion, and may be considerable. How many patients are made better by simply seeing their physician and by the assurance that they will soon get well, by the words of encouragement which he gives them. The very expression of the physician's countenance has its influence. I cannot but endorse the spirit of that old thesis once defended before the faculty, and which had for its title, "The Influence on the State of the Patient exerted by the Cheerful Demeanor of the Physician."

We have not only to consider the part played by the physician's bearing and assuring words, as hypnotic or suggestive means; the medicine itself has a certain *rôle*, and every new medicine has a period of success, which belongs to the domain of suggestion. That old asseveration—"Take this medicine; it will make you well"—expresses this notion, which has caused not a few mistakes in therapeutics.

It remains to inquire, What is the number of patients who may thus profit by hypnotic suggestion? If we refer to the figures furnished by Liébault during the year 1880, out of ten hundred and eleven persons whom he endeavored to make amenable to suggestion, he found but twenty-seven that were refractory; and, on analyzing the nine hundred and eighty-four hypnotizable persons, he showed that the characteristics of the hypnosis could be classed as follows:

Somnolence and heaviness	33
Light sleep	100
Profound sleep	460
Very profound sleep	232
Light somnambulism	31
Profound somnambulism	131

I confess that I am here again in complete disagreement with the school of Nancy, and I can affirm that nothing like this, or even approaching it, has been witnessed in our hospitals and in our practice. As I have before shown you, only hysterical patients are clearly and unmistakably benefited by suggestion, and yet there are hysterical patients who are not hypnotizable. There is, moreover, quite a group of affections with lesions in the hysterical which are not at all amenable to hypnotic treatment; and however numerous you may suppose cases of hysteria to be, they none the less constitute the exception, if we compare them with all the other diseases which we have to treat.

In conclusion, we have still to examine a last point,—Whether or not hypnotism has its evils? It has been affirmed that it is more or less dangerous to produce hypnosis in susceptible subjects, and that, instead of causing the morbid symptoms to disappear, we augment the neuropathic state of the patients, and may thus cause psychical and other troubles of great intensity. I have no opinion of my own on the subject. While we see Bernheim, Liébault, Berillon, and so many others maintain that therapeutic suggestion is perfectly safe, we see other authorities affirm its dangers, and even persuade governments, with the advice of academic societies, to prohibit the practices of hypnotism. This is what has taken place in Belgium.

I am, for my part, inclined to take my stand by the side of those writers, for this reason, if for no other, that the most earnest partisan of suggestion, Bernheim, admits that "therapeutic suggestion is an art and a science which demand a long experience and a profound acquaintance with medicine and psychology;" and in making this avowal, the professor of Nancy recognizes the fact that the practice of therapeutic hypnotism can only be made by an educated physician. This is, then, a virtual acknowledgment that it may have its dangers. And now, if I were to sum up my views, I would express myself thus:

Thanks to a more attentive study of the phenomena of suggestion, we are able to-day to establish the bases of a psycho-therapy; but this psycho therapy will never be anything but an exception in the practice of our art if we insist on limiting it to the phenomena of hypnotism properly so called; for, as I have shown you, since the foundation of medicine to our times, suggestion—*i.e.*, the influence of the physician on his patient—has played and always will play a considerable *rôle* in the result of the treatment which he orders. We have here a fact which belongs to the entire group of animal life, and which finds expression in the statement that certain beings have an influence over their fellows. But there will always remain that great group of pathological states which constitute the diseases properly so called—the pneumonias, typhoid fever, rheumatism, etc.—against which we must employ a special medication, in which hypnotism can have no part; and to suppose for a single instant that one may by

simple affirmation cause the entire cortege of morbid symptoms to disappear, is a delusion and, worse than that, an error.

TREATMENT OF MENINGITIS.

By James Barr, M.D., Liverpool, England.*

ALTHOUGH the general principles of treatment which I hope to lay down in this paper may be applied to all forms of mennigitis, my observations will directly refer to simple meningitis, whether affecting the pia mater of the convexity or of the base of the brain. I shall, however, more especially exclude pachymeningitis externa, which to a large extent comes within the domain of the surgeon, and, although great strides have been recently made in brain surgery, not always with a very happy result. It might be reasonably supposed that tubercular meningitis, which is undoubtedly an inflammatory affection of the pia mater, would come within the scope of this paper; but we seem to be on the eve of a great revolution in the treatment of all tubercular diseases, so I may be excused from saying anything of my past experience in this subject. Moreover, tubercular meningitis has hitherto been looked upon as an almost necessarily fatal disease, and cases of supposed cure have been viewed with great suspicion. I can scarcely rank myself with those who estimate the mortality of this disease at one hundred per cent., as I have seen cases recover where I had diagnosticated tubercular meningitis, though, happily, I had no opportunity of verifying the diagnosis on which my gloomy prognosis was based.

During the last few years I have had under my care thirteen cases of simple meningitis, with one death. Of these, seven occurred in my hospital practice, and are recorded at the end of this paper. The other six occurred in private practice, and as I have not full notes of them they are not here used to increase the length of this paper. Of the private cases, the meningitis in four instances affected the convexity, and all made a perfect recovery; and in two cases there was basilar meningitis. One of these completely recovered, with the exception of slight internal squint of one eye; and in the other case complete blindness resulted. I think I may fairly claim that my treatment has been very successful; but I have no wish to make any statistical use of these cases, as no uniform plan of treatment was adopted throughout, and so far as drugs are concerned, there was considerable variation. In fact, the treatment was carried out from day to day as, in my judgment, the indications of the cases demanded, and as my education in the subject improved with increased experience.

For effective treatment we should arrive at an early and accurate diagnosis. This is not always an easy matter, and in many cases it requires a considerable development of symptoms before we can feel confident as to the exact nature of the case with which we are dealing. It would carry me much beyond my present purpose to do more than touch the fringe of this subject. There is one disease—typhoid fever—which even the most skilful diagnosticians sometimes mistake for meningitis, and my fatal case was treated as one of typhoid fever for five weeks before his admission to hospital. Even then we did not recognize that the patient was suffering from basilar meningitis until the symptoms had further developed, and it was only at the autopsy that we felt justified in saying that at no period of his illness had he had typhoid fever. It has been recently stated that the condition of the knee jerks enables us to distinguish typhoid fever from meningitis, broadly speaking, the knee-jerks being supposed to be absent in meningitis; but I am in a position to state that such is not the case. I have seen the knee jerks exaggerated, and even ankle clonus present in undoubted cases of meningitis, whereas it is only in severe cases of typhoid that these conditions appertain. If such observations be carried out for a more or less lengthened period of time, it will be found that the knee-jerks are much more variable in meningitis than in typhoid fever. In the latter disease the knee-jerks are much exaggerated in severe cases, and this increases with the progress of the disease, and is often accompanied by marked ankle clonus. In meningitis, on the other hand, the knee jerks and all the reflexes are apt to be increased during the hyperæsthetic stage, but when any cerebral effusion takes place, the knee-jerks are apt to be abolished, at least temporarily. As a diagnostic sign I attach far more importance to the hyperæsthetic condition itself, which, I may say, is invariably present in the early stages of meningitis, whereas in typhoid fever, although there is no abolition of reflex irritability, the patient is apathetic, and does not present any inordinate sensitiveness. In

* Physician to the Northern Hospital, Liverpool, England.

typhoid fever the urine with Ehrlich's test presents a red, ruby color, but a somewhat similar reaction has been observed in meningitis. The absence of this color-reaction might negative typhoid fever, but its presence would scarcely exclude meningitis. Without further divergence on the question of diagnosis, we will at once suppose that we have to deal with a case of meningitis. It is most important that the nature of the case should be thoroughly recognized as early as possible, and that a decided line of action should be adopted, as the brain is more sensitive to inflammatory disturbance than any other organ of the body.

The patient should be submitted to as little reflex disturbance as possible. He should be kept in a dark, noiseless room, so that as few nerve-impressions as possible should travel to the sensorium by either the eye or the ear. The very injurious effect of noise was well exemplified in our fatal case, where the severe exacerbation, which ended in his death, began on the night when a patient suffering from delirium tremens and carbolic acid poisoning was unfortunately admitted to the same ward. Due attention should also be paid to the cutaneous sensibility ; when practicable, the patient should lie on a water-bed, and be lightly clothed. The room should be well ventilated, and kept at a uniform temperature of about 60° F.

There is no disease in which antipyretic treatment requires to be more promptly and efficiently carried out. Of all the means at our disposal for this purpose, I prefer a large ice-cap, or a cap formed of Leiter's tubing with a constant stream of iced water flowing through it, applied to the shaven scalp. The application of cold to the head not only lowers the general temperature, but also moderates the circulation within the cranium. Four of my patients—three of whom made good recoveries—were treated in the water-tank with decided advantage. The continuous immersion in water of 90° to 95° F. is a very effective antipyretic agent, and improves the vascular tone ; but I do not attach so much importance to this method of treatment in meningitis as I do in typhoid fever. When it is adopted in meningitis it should be supplemented by the use of the ice-cap. The cold to the head should be continued until the general temperature has been for some time subnormal, and if any pyrexia should afterwards recur, it should be immediately combated by a resort to the ice-cap. I have very little faith in the use of the new antipyretic drugs in this disease, but I can see no objection to an occasional dose of antipyrin when the temperature is very high. For general use I much prefer the free administration of carbonate and acetate of ammonium. If there be any fear of the formation of thrombi in the cerebral sinuses, liq. ammon. fort., well diluted with iced water, may be given, or the patient may be made to inhale Dr. Richardson's preparation of ammoniated chloroform, which consists of equal parts of chloroform and absolute alcohol saturated with ammonia gas. I would be inclined to favor the use of antimonial wine where there was much vascular excitement.

In the early stage of the disease I have still some faith in the old-fashioned remedy of a fly-blister to the nape of the neck. In the later stage, where there was evidence of much cerebral effusion with general paresis, and perhaps subnormal temperature, it would be worth while to try the effect of liquor epispasticus painted over the whole scalp.

The bowels should be kept open throughout the illness, and of all agents for this purpose I prefer calomel. The vomiting is usually of cerebral origin, and any direct treatment to the stomach is generally of little avail ; however, a sinapism to the epigastrium, and the internal administration of bicarbonate of sodium and sal volatile frequently do good. The hiccough, which occurs at a late stage, is best relieved by hypodermic injections of morphine or of morphine and atropine.

To relieve the cerebral excitement, sleeplessness, and general restlessness, I have gradually arrived at the conclusion that there is no drug equal to opium, very freely administered. A favorite combination with me, especially where the temperature is above the normal, has been equal proportions of Dover's powder and salicylic acid ; 10 grains of each every three or four hours for an adult. This may be increased, or supplemented by an occasional hypodermic injection of morphine, so as to keep the patient as sleepy and quiet as possible without actually producing coma. When there is any tendency to constipation, a powder composed of 1 grain of opium and 1 grain of calomel may be given to an adult every three or four hours. In some cases morphine may be adjudged the better remedy, but whichever is given, there should be no timidity in its use. Contrary to what was formerly supposed, opium and morphine lessen the circulation in the cerebrum. When there is much cardiac excitement, with defi-

cient vascular tone, a combination of opium, digitalis, and quinine will be found useful. When there are convulsions, the inhalation of chloroform will prove efficacious.

In this disease I have now completely discarded bromide and iodide of potassium, while such drugs as chloral hydrate, sulphonal, paraldehyde, and urethan are with me discredited. Of course, in any case when there was reason to suppose that there was a syphilitic basis, I would employ iodide of potassium, or more likely some preparation of mercury.

With the use of local or general blood-letting in this disease I have no experience, and in those cases where such a course might be deemed advisable I would rather try the effect of antimony. Blood-letting would be useful in the early stage if there were violent action of the heart and increased arterial pressure, but such conditions do not often occur.

In basilar meningitis, where there is a tendency to bulbar paralysis, atropine in small doses should be frequently given.

The diet throughout should be of the blandest description, consisting chiefly of milk, farinaceous food, and butter. Alcohol in every form should be avoided.

The following cases were under my care in the Northern Hospital. For the notes of the cases I am largely indebted to our late and present house physicians, Drs. Milligan, Wallace, and Askin.

Case I. *Meningitis of the Convexity: Cure.*—G. S., aged 11 years. Admitted to the Northern Hospital, April 22, 1888, suffering from "fits." He is a thin, delicate-looking boy, and his mother states that he has never been strong. Some years ago he had a cough, but since then he has been fairly well, except that on one occasion he had a slight discharge from his ears, and about nine months ago he had a "fit." He has never had any injury to his head. Father and mother healthy; one sister suffers from consumption; another sister and brother are in good health.

He has complained of pain in his head for the past month, but little attention was paid to his condition until yesterday afternoon, when he had a "fit," and between eight o'clock this morning and the present time (2 P.M.), he has had five similar attacks. On admission he was seized with one of these attacks. He was lying quietly on the sofa, when he made a sucking noise with his mouth, and clonic spasms began in the muscles at the angle of the jaw on the right side. This continued for some time, and there were also occasional convulsions of the corresponding muscles of the opposite side, and of the sterno-mastoid and platysma myoides of the same side. During this fit the pupils were irregular,—the right contracted and the left dilated, but in subsequent attacks they were regular and contracted.

He was very irritable, and objected to being touched, and there was evidently some photophobia, as he lay on his side with his face turned away from the light, and he had his legs drawn up. It was also noticed that there was slight paresis on the right side of the face, and of the occipito-frontalis: as when he cried, the wrinkling was much more evident on the left side. There were no convulsions or paralysis of the limbs. The knee-jerks were well marked; plantar reflex present in both feet, but strongest in left. No ankle clonus. Between the fits he was very lethargic, but when roused up he complained of pain in his head, though this was not localized. There was no optic neuritis, and the fundus appeared normal. Tongue clean; he vomited; and during a fit his bowels acted twice. Temperature, 100°; pulse, 112. Thoracic and abdominal organs normal. He was placed on milk diet, ordered a powder consisting of calomel, 4 grains, and compound jalap powder, 20 grains; also 3 grains of potassium iodide, and 10 grains of potassium bromide every four hours. He had an ice-helmet applied to his head.

April 23.—He slept well last night, and had no convulsions. He still complains of headache, and is in a drowsy, apathetic condition. Urine acid, sp. gr. 1020; no albumen. Temperature normal, but in the evening rose to 100°; pulse 116.

April 24.—There is considerable improve this morning. Both optic discs are red, and the right has a deeply-marked cup in the centre. Hearing, smell, and taste normal. No paralysis of tongue or soft palate. Temperature normal, and afterwards continued so. From this time the improvement was steady, and on April 27 he was ordered a chop.

June 1.—He was discharged to-day quite well, except that there was still slight facial paresis on the right side.

Case II. *Basilar Meningitis: Cure.*—T. F., aged 18 years, brass-founder. Admitted to the Northern Hospital on the morning of May 22, 1888, in a semi-conscious state, having been found sleeping in the street. The previous history of the case, as after-

wards ascertained, would seem to be as follows: He had not felt well, and had suffered from a headache for the previous fortnight. About a week ago he was in the country, and fell asleep about 10 A.M. in the sun, and did not awake till 5 P.M. He was then unable to get up, was taken to a barn, where he had cold water thrown over him, and he vomited, and afterwards had no distinct recollection of what happened between this time and his admission to hospital.

On reception he was in a drowsy, stupid condition, and could only be roused up with difficulty. He was then very irritable, and resisted any interference. There was no paralysis, nor any convulsions. Pupils equally contracted, and sensitive to light. Bowels freely open; motions greenish. Temperature normal; pulse 116. Urine acid, sp. gr. 1013; a trace of albumen. Ice-cap applied.

May 24.—More intelligent. Countenance flushed, head retracted. No optic neuritis. Temperature rose this evening to 100.8° F.

May 25.—He has now one hand considerably swollen, and painful to the touch, and he complains that the other hand is painful, but it is not swollen. He is very irritable, and continually whining. His head is much retracted. Sordes on the teeth. Bowels loose, and motions offensive. Heart and lungs normal. His temperature reached 102° this evening. He was ordered a mixture containing salicylate and sulpho carbolate of sodium.

May 26.—Considerably weaker, but not delirious, and when roused speaks rationally. There is an eruption of herpes round the mouth, but no lung disturbance. Hands as before noted. He was immersed to-day in the tank; temperature of water 95° F. Patient's temperatures to-day, 101.6°, 100.8°, 100.6°, 99.8°.

May 27.—He appears better, and complains of hunger. Urine acid, sp. gr. 1021; no albumen. Slept well last night in the bath, and talks rationally to-day. Temperatures, 100.6°, 100.6°, 102°, 100.4°, 98.4°, 99°; pulse 88.

May 28.—He was much better this morning, and had a good pulse, but his temperature steadily rose during the day, the records being 99.2°, 99.6°, 100.4°, 101°, 102.4°, 102.4°.

May 29.—He passed a very restless night, and his temperature remained at 102.4° till 8 A.M., but it fell to normal at noon. After this it rose slightly, but only reached 99.6° at 8 P.M., and at midnight. His head was still retracted, but could be more easily extended. Left hand still swollen and painful. Pulse 88, slow, full, and regular.

May 30.—Slept well all night, and has taken food well. Temperature ranged from 98.4° to 99.6°.

May 31.—He looks and feels well. He was taken out of the tank at noon, and, as his temperature did not rise to any notable degree, he was not replaced. Temperatures, 99.4°, 99.6°, 99°, 99.4°, 100°, 99.8°.

June 1.—Slept well last night, and feels better. No swelling of hands, and free from pain. Temperatures, 99.4°, 99.4°, 99.4°, 99.4°, 99.4°, 99°. From this time his temperature remained normal; he steadily improved in every respect, and was discharged quite well on June 14.

CASE III. *Basilar Meningitis: Cure.*—A. A., aged 18 years, admitted to the Northern Hospital August 2, 1888, complaining of headache. He has frequently suffered from headaches, and has a neurotic family history. The history of the present illness is as follows: He had a headache when he left Montreal on July 24, but was better next day. On July 26 he was sea-sick, and then remained well until July 29, when the headache returned, and from this time felt feverish, but did not vomit. On July 30 he noticed that his speech was affected. During the last two days this has got worse, as also his headache. He has had no convulsions.

He is an intelligent, healthy-looking boy, with an obvious defect of speech. He drawls and pronounces his words badly, and this is especially noticeable when he attempts a sentence. He is rather drowsy. He says his sight is not so good lately, but he can see the time by a watch. Slight photophobia. Pupils equal and contracted. Optic discs and fundus normal. His hearing is defective, and he says there is a buzzing in his ears. There seems to be no derangement of sensation, and there is no loss of motor power. The plantar, epigastric, and cremasteric reflexes are normal, but the knee-jerks are absent. No ankle clonus. There is a cicatrix on the forehead and another at the vertex, the result of injuries in childhood. Tongue furred but moist; appetite bad; bowels were confined, but have been freely moved by an aperient. There is a slight cough, but no mischief can be detected in the lungs. Respiration 20. Heart's action strong and thumping; the sounds are loud and clear, and at apex first sound reduplicated. Pulse 100, regular, full, and bounding; skin hot and dry; temperature 104°

Urine contains a trace of albumen. He was placed on a milk diet, and had 15 grains of antipyrin. Ordered liq. ammon. acetat., ʒiii., sp. etheris nitros, ʒss. every fourth hour.

August 3.—He is in much the same condition as yesterday. He complains of difficulty in swallowing. There is considerable pain and tenderness over the abdomen; bowels not moved since admission; tongue furred. Temperature 104.2°. Ordered pil. colocynth. et hyrs., grs. x.

August 4.—Slight ptosis of left eyelid. Vomited; delirious and drowsy; pulse 116; temperature 104° in the morning, but fell to 102° in the evening. Urine drawn off; slightly albuminous. Ordered potass. iodidi, grs. x., thrice daily.

August 6.—The ptosis of left eyelid not noticeable. Still drowsy, but not delirious. Urine and fæces passed involuntarily. Temperature, M. 100°; E. 103.2°; pulse 130.

August 7.—Looks rather better and speaks more plainly. His bowels are open, and he has passed urine voluntarily. Temperature, M. 101.8°; E. 102.8°; pulse 114. Urine alkaline, sp. gr. 1026; a trace of albumen.

August 11.—The slight improvement has been maintained since last note, and his temperature has slightly fallen, the records to-day being M. 100°; E. 100.6°; pulse 106.

August 16.—He is deaf and drowsy; sleeps well at night. In addition to 10 grains of potassium iodide, he is now ordered 20 grains of potassium bromide thrice daily.

August 25.—There has been very little alteration in his condition since last note, and to-day he was immersed in the tank at a temperature of 95°. From this time he steadily improved, and by the 27th his temperature was normal. He was taken out of the tank on August 30. For the next few days the temperature fluctuated one or two degrees, and on September 2, 3, 5, 6, and 7 he had a rigor with considerable elevation of temperature, but it was quickly lowered on each occasion by 10 grains of antipyrin, and it was not deemed necessary to put him again in the tank.

September 6.—There was first noticed to-day a slight return of the knee-jerks. From this time the progress was satisfactory, and he was discharged on November 26 quite well.

CASE IV. *Meningitis of the Convexity and Bronchitis: Cure.*—H. B., aged 49, carter. Admitted, under the care of Dr. Barr, January 3, 1889. A short time previously this patient was in the surgical side of the Northern Hospital, suffering from injuries to his head, caused by a fall of thirty feet. After his discharge he suffered so much from headache that he returned to the hospital on January 2, and was transferred to the medical wards on January 3, on account of convulsions. He was then in an extremely irritable condition, and would not allow himself to be examined. There was marked photophobia. Tongue dry and furred; breath offensive; bowels constipated; urine alkaline, sp. gr. 1018; a trace of albumen; urea 1.9 per cent. temperature 100°.

He was troubled with cough, and there were bronchial râles over chest. He was ordered croton oil, to have his head shaved and an ice-cap applied, and a blister to nape of neck; to have an ammonia and senega mixture for his cough.

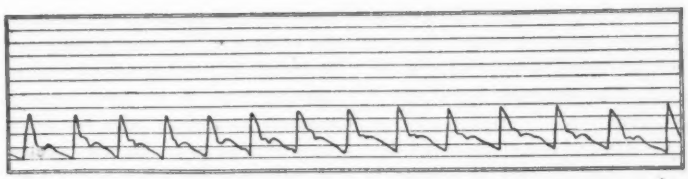
January 8.—He is much better, and now quite sensible. There is a large ulcer on left side of tongue, caused by a bite during the convulsions. Ordered a mouth-wash. Tongue clean, and cough much better.

January 16.—Discharged quite well.

CASE V.—In the *Lancet*, March 15, 1890, I recorded a severe case of typhoid fever, complicated with cerebro-spinal meningitis, and double otitis media. She was immersed in the tank for eleven days, had the ice-cap applied to her head, and was treated with opium and salicylic acid. She made a good recovery.

CASE VI. *Basilar Meningitis: Death.*—J. M., joiner, aged 29. Admitted to the Northern Hospital September 8, 1890. He is a rather spare, nervous man, but has enjoyed fair health, with the exception of one attack of erysipelas and iritis about five years ago. Last February he had orchitis. His present illness began about five weeks ago with headache, pains in the back and right groin. He was going about for a fortnight, but for the last three weeks he has been confined to bed. He had diarrhœa at the commencement, and it returned again about ten days ago. He was sent in, supposed to be suffering from typhoid fever, though on admission the evidence on that head was slight, and it was decided that, if he had had that disease, he was then recovering from it. Temperature 101° F. Tongue moist, coated in centre with a thick, dirty-white fur; tip and edges clean. Appetite fair; bowels confined, and when moved with an enema, the motions were passed, dark brown in color, and alkaline in reaction. The following morning it was noted that he had slept badly during

the night. Temperature has fallen to normal; pulse 96, full, soft, and compressible; heart-sounds normal; respiratory murmur feeble; no abdominal distention or tenderness, and no increase of splenic dulness. The glands in right groin were large. Plantar reflexes and knee-jerks present; ankle clonus on left side. Urine acid, sp. gr. 1020. No albumen; did not give a red ruby color with Ehrlich's test. He was placed on bread and milk diet, and ordered 10 grains of citrate of potassium every four hours.



September 18.—This patient has progressed favorably since admission. His temperature has ranged from 98° to 101° F., the mean of fifty observations being 99.26°. Pulse ranged from 80 to 96. At this time the hospital was very full, and unfortunately, on the night of the 18th, there was a patient suffering from delirium tremens and carbolic acid poisoning admitted to the ward where this patient was situated; consequently he had a sleepless night, and about 9.30 the following morning he had a rigor, and soon afterwards vomited. At noon his temperature was 104.8°; pulse 120; respiration 26. Complains of headache. He was ordered an enema, which produced two free evacuations. Temperature, 2 P.M., 102°; 4 P.M., 101°; 8 P.M., 102°. A dose of nepenthe.

September 20.—Did not sleep well last night, and complains of severe headache. Vomited. Breathing feeble on right side, but otherwise no phenomena of lung mischief. No abdominal pain or tenderness. Pulse 108; temperature, 4 A.M., 99.6°; 8 A.M., 99°; noon, 101°; 4 P.M., 101.6°; 8 P.M., 100.8°. He was ordered a bismuth mixture, and at noon had 8 grains of antipyrin.

September 21.—He did not sleep at all last night, although he had 1 drachm of bromidia. He complains of very severe headache. Temperature at 4 and 8 A.M. was 100°. He then had a rigor, and at 8.15 A.M. it was 102.2°; at 9 A.M. 104°; 10 A.M., 104.8°; 10.30 A.M., 103.8°. He had 8 grains of exalgine, and afterwards 10 grains of antipyrin. At 2 P.M., temperature 102.4°; pulse 124. He was now in a semi-conscious condition, would not answer questions or put out his tongue, but was irritable, and resisted any interference. Sordes on teeth. There is still ankle clonus on left side, but knee-jerks are not well marked. He was now ordered a dose of calomel, and placed in the tank, the temperature of the water being 90°. Soon afterwards he became partially conscious, put out his tongue, and answered questions, but did not seem to know that he was lying in water. The following are the temperature records of to-day: 4 P.M., 100.4°; 8 P.M., 102.4° (in rectum); 10 P.M., 99.7°.

September 22.—Temperature at 1.30 A.M. 99.4°; but at 3.30 A.M. it was 102.6° in rectum and 101.6° in mouth; at 8 A.M. 101.8° in mouth. He passed a very restless night, notwithstanding two 10 grain doses of Dover's powder, and did not sleep till 2 A.M. He then slept quietly for some hours with his eyes half open, and afterwards felt much better. He was quite conscious and, he said, quite free from headache, except when he moved; tongue moist and only slightly furred; pupils rather contracted; pulse 88, soft and full; respiration 20; bowels confined, and although he had two ounces of castor oil to-day, he had no motion till the following morning, when it was dark and formed. He was now ordered an ice-helmet.

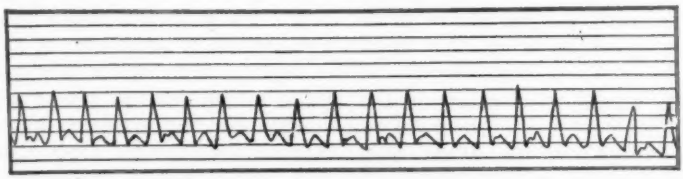
September 23.—He had a sleepless night, although he had 30 grains of Dover's powder. He is quite conscious, says that he is now free from headache, but feels that very little would bring it on. Tongue moist; pulse 84, stronger; pupils contracted. Ordered 10 grains of Dover's powder every four hours. Temperatures to-day, 99.8°, 99.2°, 99°, 100.4° (when out of the tank while it was cleaned), 98°, 99 6°.

September 24.—He had a better night, sleeping for several hours at intervals, with his eyes half-open. He was occasionally delirious, and shouted a good deal. During the day he slept quietly, but when awake he shouted, muttered, and talked to himself. When spoken to he answered intelligently. Herpetic eruption on lips. Pulse 104; pu-

pils contracted. He has taken nourishment very freely since he was placed in the tank. Bowels freely moved. Temperatures to-day, 98.8°, 98°, 97.8°, 99 2°, 99°.

September 25.—He had a very restless night, was very delirious, and shouted all night. Quite sensible when spoken to, but he is constantly muttering to himself. He says he has no headache. There is, and has been for last two days, well-marked muscular tremor, and the patient shivers, but he says that he does not feel cold. The temperature of the tank is now raised to 96°, but the ice-cap is continued. Temperatures, 97.8°, 98.4°, 99°, 98.4°, 98°, 100°.

September 26.—He did not sleep at all last night, although he had chloral and bromide in addition to the Dover's powder. He was restless and delirious. He had also a hypodermic injection of $\frac{1}{6}$ grain of morphine, but it had no effect. Temperature, 4 A.M., 99.6°; 8 A.M., 99°; noon, 99.2°; pulse 124 (see tracing).



As it seemed almost impossible to get him to sleep, and as the progress was not satisfactory, he was taken out of the tank at 5 P.M. The ice-cap was continued to the head. At 5.45 P.M. his temperature reached 100.8°. He then had 15 grains of antipyrin, which caused profuse diaphoresis. At 7.30 P.M., temperature 100.6°; pulse 160. The shivering stopped after he was put to bed, but his other symptoms became worse. Dr. Barr examined him at 8.30 P.M., and found commencing double optic neuritis, knee-jerks exaggerated, ankle clonus on left side. Temperature 101.4°; pulse 156. He got 18 grains of antipyrin at 11 P.M. No sleep to-day.

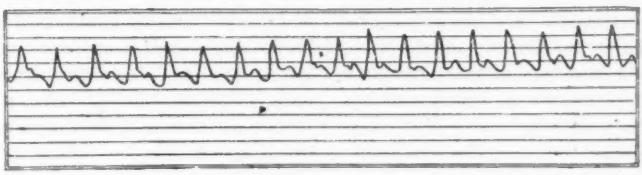
September 27.—He had one drachm of paraldehyde last night in addition to his Dover's powder, but he did not sleep. He was very restless, lay with his eyes widely open, tossed his arms about, grasped at imaginary objects in the air, and was muttering. Bowels acted twice involuntarily; motions brown and offensive. Had hiccoughed several times during the night. Temperature, 2 A.M., 99.2°; 2.30 A.M., 99 8°; 4 A.M., 101°; 6 A.M., 101.6°; 7.40 A M, 102°; pulse 150; urine 102.2°; pulse 172; tongue dry and furred; teeth covered with sordes; pupils dilated from the effects of atropine; urine and fæces passed involuntarily; motions loose, brown, and very offensive. He was now ordered 15 grains of salicylic acid and 10 grains of Dover's powder every three hours. He lay wide awake, and his appearance was not unlike that of delirium tremens. To try and induce sleep, chloroform was administered, but it was very difficult to get him under its influence. At 10.30 P.M. Dr. Barr prepared Dr. B. Ward Richardson's ammoniated chloroform, and administered it by inhalation. It at first seemed to irritate him, but after inhaling it for about an hour, he was pretty well under its influence, breathing deeply, with eyes partially closed and pupils contracted. Temperatures, 101°, 102°, 102.2°, 100.4°, 100.2°, 99.8°, 101°.

September 28.—From 12.10 to 2 A.M. slept very well; he then had two feeders of milk; bowels and bladder acted involuntarily. He had several short sleeps under the influence of ammoniated chloroform. His arms twitched convulsively, and every now and then the left side of the body gave a convulsive jerk. There were several involuntary evacuations of light-brown, offensive fæces during the night. 10 A.M.—Is quite conscious, but restless; tosses his arms about; dorsal decubitus; pulse 128; knee jerks present, but less marked than two days ago; ankle clonus present. During the day there was a slight improvement, and he passed urine voluntarily twice. Temperatures, 100°, 100.4°, 101°, 99.2°, 99°, 99.2°; pulse 132 (see tracing). Ordered 1 grain of calomel to be added to each powder.

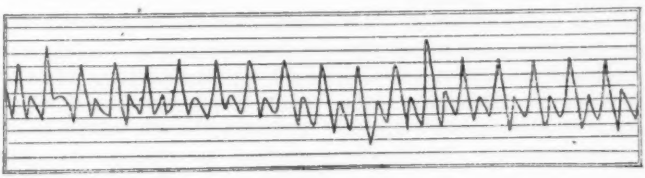
September 29.—He had several short sleeps without any ammoniated chloroform, and seems rather better this morning. He says he feels better, and he is quieter, but his hands and arms are still moving a little. Tongue dry and fissured; pulse 132; ankle clonus present; knee-jerks not well marked. During the day he became worse, did not sleep, and was very restless. At 4 P.M. he was replaced in the tank at a temperature of 95° F.; he then slept from 4.15 to 8.30 P.M

Temperatures to-day, 99°, 101°, 101°, 100°, 99.4°, 98.6°.

September 30.—Had several short sleeps during the night under the influence of his powders and ammoniated chloroform. Tongue



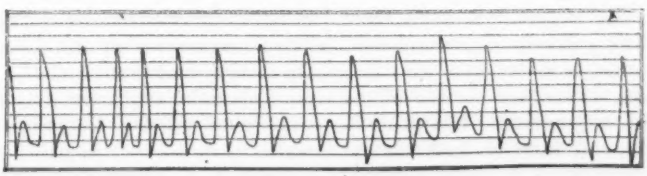
not so dry; pulse 120, stronger; motions loose, yellow, and offensive; pulse 124. Mr. Walker examined optic discs and found them fluffy.



October 1.—Sensible this morning; pupils normal; pulse, 132; temperatures, 99.8°, 98.8°, 98 4°, 99.2°, 98.4°.

October 2.—Had ammoniated chloroform three times during the night, and slept about six hours. Is sensible, and says he feels better. He got rather worse in the afternoon, and was much troubled with hiccough. Dr. Barr found both optic discs very ill-defined, and veins much enlarged. Temperatures, 97.8°, 98.8°, 99.2°, 99°, 99.6°, 100°.

October 3.—He was not so well this morning, and was much troubled with hiccough; but he showed signs of improvement in the afternoon. Mr. Walker examined his optic discs, and found the veins enlarged and arteries obscure. Pulse 108; temperatures, 99 4°, 98.2°, 99.4°, 98°, 99.8°, 99.6°.



October 4.—Not so well to-day; not so sensible; tongue moist; knee-jerks exaggerated, no ankle clonus; muscular tremor well marked; hiccough troublesome, and he yawns frequently. Temperatures, 100°, 100°, 98°, 99.4°, 101°

October 5.—Slept about four hours last night. He vomited this morning, and hiccough troubled him occasionally during the day. Temperatures, 99.2°, 99.2°, 99°, 97°, 98.2°, 100.2°.

October 6.—I made the following note:

"A daily record of the progress of this case has been fully noted by Dr. Askin, but a few general impressions may be now recorded. The condition of the patient has been extremely variable,—at times fairly sensible, and correctly answered all interrogatories, while soon afterwards he would relapse into a state of stupor from which he could be barely roused. Last two days his mental condition has been almost a total blank, but lately there seems to be a very considerable improvement. What is now specially noticeable is that the general venous turgescence and hyperæmic condition of his head, which uninterruptedly continued from the beginning of illness till lately, has now to a great extent disappeared. The tâche cerebrale is even now, and has been throughout, well marked. The hiccough, which began about four days ago, is still very annoying, and has not been much relieved by the medicines which he has received. The condition of the tongue has been somewhat variable; but on the whole has been fairly moist, and only slightly furred. The general hyperæsthesia has been lately less marked. At one time he was so sensitive that he could be barely handled or temperature taken in

rectum without making him shout and complain of pain. The general muscular tremor and reflex irritability are now less marked; still it is difficult to take a sphygmographic tracing owing to the jerking of his arm. The ankle clonus has now disappeared, and patellar reflexes are very much less marked. The reaction of the triceps muscle of the arm, which at one time was very marked, has now disappeared. His heart's action is and has been fairly strong throughout. The pulse has been extremely variable, the frequency varying every few seconds, and from time to time the number of beats frequently differed from 20 to 30 in the minute. The breathing has been occasionally frequent, but there have been no marked chest symptoms. The splenic and hepatic dulness are about normal. Abdomen, if anything, is rather retracted. The urine, when examined, has been found free from albumen, with one exception, and did not give Ehrlich's test. Mr. Walker has again examined his eyes. Left disc much better defined; disc somewhat woolly. The border of disc in right eye is by no means defined yet. The pupils have been contracted throughout, except when under the influence of atropine."

At 11.20 P.M. he had a fit of coughing which lasted till 12.20 A.M., when he died from asphyxia.

Post mortem.—J. M. died October 7, at 12.30 A.M.; autopsy, 3 P.M. Height, 5 feet 7½ inches. Rigidity present; lividity of dorsal aspect. Body presents the appearance of that of a well-developed, but not very muscular, man; it is considerably emaciated, but not extremely so. The abdominal cavity is not distended. The skin of hands and feet is macerated from immersion in the tank. The only other noteworthy external appearance is a clean-shaven scalp.

On removing the calvarium the dura mater was found adherent to the skull at several places, and there was general turgescence of the veins. In the longitudinal sinus there was a long, thin, partially-decolorized clot. The vessels of the pia mater were all much congested, giving the whole surface of the brain a purplish appearance. The veins in the sulci are full, and many of them contain fine fibrinous threads of decolorized fibrin. Over the frontal lobes there are many small patches of lymph. At the base, the circle of Willis, the whole of the pons, the medulla oblongata, and about one-third of lower surface of the cerebellum are covered with a thick layer of lymph. On cutting through substance of brain the punctæ hæmorrhagicæ are large and numerous. The lateral ventricles are distended—especially the descending cornua—and are filled with dark sanious fluid containing considerable quantities of lymph; the two choroid plexuses are covered with flakes of lymph. The third ventricle is filled with sanious fluid containing considerable quantities of lymph. The iter e tertio ad quartum ventriculum is dilated. The whole medulla oblongata is bound to the cerebellum by a thick layer of lymph. The fourth ventricle is filled with thick, grumous fluid, and its floor is very much injected. The brain-substance surrounding the lateral ventricles is rather soft, and the corpus callosum seems somewhat diffluent, but otherwise the brain-substance seems of normal consistence. The cerebellum is normal.

On laying open the chest and abdomen there was a thin layer of subcutaneous fat. Both lungs were bound to chest walls by numerous pleuritic adhesions. The left lung weighed 28 ounces, the posterior aspect being conjested and very œdematous, and the lower part of upper lobe collapsed; otherwise lung-structure healthy. Right lung weighs 38 ounces; posterior aspect, which lies in vertebral groove, is semisolid and very œdematous; the anterior portion, comprising the whole of middle and greater part of upper lobe, is very œdematous, but otherwise the lung-substance is healthy. The trachea and larynx are much injected, and contain large quantities of frothy fluid.

Heart weighs 11 ounces when free from clot. The right auricle and ventricle are distended with fluid blood and partially decolorized clot. The left ventricle and auricle only contain a small quantity of fluid and some partially decolorized clot. Valves and heart muscles normal.

Liver, pale-yellow color and greasy to touch. Two kidneys weigh 11½ ounces; structure healthy. There is a small quantity of fat in omentum and mesentery. The small intestines are rather distended, walls thin. On careful examination of the whole bowel no ulceration could be detected. Peyer's patches not visible. Large bowel quite normal.

CASE VII. *Basilar Meningitis: Cure.*—H. H., aged 23, clerk. Admitted to the Northern Hospital, October 12, 1890. He was sent in by Dr. Gormley, with whom I saw him the previous night, and obtained the following history: The patient had been out of work for some time, and his landlady noticed that

he had been falling off in flesh for the last five or six weeks. For last eight or ten days he had complained of tingling sensations in his hands and feet. On October 5 he had an attack of convulsions, and has since been troubled with muscular twitchings. On October 8 he took to bed. When I saw him he was in a semi-conscious condition, and did not understand anything which was said to him. He was sensitive to painful impressions. Knee-jerks could be scarcely elicited. Temperature, 99.2° F.; pulse 60, slow and full. Ordered an ice-cap, a blister to nape of neck, and a dose of calomel.

October 12.—Very stupid, but puts out his tongue when told to do so. Lies with his eyes open; pupils dilated. Pulse 72, slow and full; temperature 98.4°–99°; tongue clean. Bowels opened with a dose of sulphate of magnesium. Ordered ½ grain of opium and 1 grain of calomel every four hours. Milk diet.

October 13.—Very listless, and does not seem to clearly understand any questions, but shows a disposition to be cross. Pulse variable; at one time ran up to 148; temperature 99.4°–100°. He did not sleep at all last night, although he had a dose of nepenthe in addition to his opium and calomel powders. Knee-jerks barely noticeable. Between 5 and 6 P.M. he had five convulsive seizures. He had 5 grains of calomel, and blister to neck.

October 14.—He did not sleep in the early part of the night, but at 1.45 A.M. he had a hypodermic injection of ⅙ grain of morphine, after which he slept quietly, with his eyes half-open. He keeps picking at his nose and moving his mouth, but there has been no return of the convulsions. Tongue moist, coated with a grayish fur; pupils contracted; abdomen retracted; muscles tense and tender to touch. He resists manipulation, and holds himself stiffly while being examined. Plantar reflexes absent, but knee-jerks lively. Pulse 84–72; temperature 99.8°–98.4°; respirations 12. Bowels confined; dose of Epsom salts.

October 15.—In much the same condition. Temperature normal; pulse 88.

October 16.—He had a dose of laudanum, but did not sleep at all last night. Temperature normal; pulse 92. Bowels opened with an enema.

October 18.—He had a hypodermic injection of ⅙ of a grain of morphine at 11 P.M., and again at 3 A.M. After this he slept quietly with his eyes closed until 6.40 A.M.; passed urine involuntarily He seems easier this morning, but he is still sullen, restless, and frequently pulling the ice-cap off his head. Tongue moist, coated with a white fur; bowels moved with an ounce of sulphate of magnesium; abdomen retracted; knee-jerks present, well marked on left side; temperature 98.4°–99°; pulse 68.

October 20.—Had a good night. Bowels moved with Epsom salts. Temperature 98°; pulse 56. Dr. Barr found that both optic discs presented a reddish-gray appearance, and were slightly swollen; veins enlarged. His general condition is much improved.

October 21.—Did not sleep well. Temperature 98°; pulse 60; bowels freely open. From this time he steadily improved. The ice-cap was discontinued on the 25th. Mr. Walker examined his eyes on the 28th, and found his optic discs normal. He was placed on ordinary diet on November 19, and discharged quite well and in good condition on November 28, 1890.

---

*CHRONIC URETHRITIS.**

By L. Bolton Bangs, M.D.,† New York.

THE purpose of this short paper is to suggest to you some topic for discussion, and I know of none which offers a better opportunity for the presentation of various views than that of chronic urethritis. Although it is an old and much-written subject, it maintains a position of interest to us as professional men, and continues to be the object of varied surgical effort. It yet stimulates the invention of operations, instruments, and injections.

Successive crops of our younger brethren return from Vienna year by year with Ultzman syringes; each crop enthusiastic about the result of injecting into the deep urethra and bladder varying solutions of alum, permanganate of potassium, carbolic acid, zinc, etc., and it has fallen under my observation to find all of these gentlemen in turn giving up these solutions in order to resort to other methods. Enthusiasm and disappointment seem to follow each other closely.

The enthusiasm is welcome and should be

* Read at the meeting of the New York Clinical Society, December 26, 1890.

† Surgeon to St. Luke's and Charity Hospitals, New York; Professor of Genito-Urinary Diseases in the New York Post-Graduate Medical School.

maintained, but it has seemed to me that we might be saved some of this disappointment and much waste of time if we were a little more discriminating and classified our cases more carefully.

It should be borne in mind that the same symptom, say, for instance, the morning purulent drop, with which we are all so familiar, is due to more than one cause, and its final cure may be the result of attention to many different conditions. Constitutional or vital, as well as local states, are important factors in the healing process in any region of the body, and must always be considered in relation to our topic. This may account for some of the discouragement which we have met in treating these cases in hospitals or dispensaries, for here it is well-nigh impossible to secure the conditions of time and attention which are essential. Indeed, there are some in which no permanent cure can be effected, excepting by a *persistency*, which implies that the patient shall be so managed as to maintain absolute confidence in his medical adviser, and be content to pursue—no matter how long the time may be—the treatment which has been laid out for him.

In many of these chronic cases the time of weakness is when the patient begins to rotate from one doctor to another. Each practitioner in turn studies the case, makes his diagnosis, and, so to speak, begins all over again. Thus we find patients who have been year after year under treatment but still have the gleet.

Many patients with chronic urethritis, if carefully examined, will be found to have stricture of large calibre, which in itself is an obstacle to the permanent healing of the mucous membrane; but it is necessary in some of these persons not only to radically remove the stricture or strictures if possible, but to treat the diseased membrane for an indefinite time after the stricture has been removed. Hence I believe that it is judicious and humane to tell a patient applying for relief from a chronic urethral discharge, and in whom stricture of large calibre is present, that after the operation upon the stricture it may be necessary to pursue some method for the treatment of his urethra, thus saving many individuals from the disappointment of finding that their discharge was not immediately cured by the operation alone.

In order to simplify this paper and limit its scope, I shall call your attention to only two or three points.

In illustration of the necessity for "persistency" and of treatment after stricture has been removed, I beg leave to narrate the following case:

This gentleman came under my care in June, 1886. He had had two attacks of gonorrhœa, the last one in 1881. Since then he has had more or less discharge. He had had varied treatment, but, in spite of all, his difficulty, consisting of a whitish drop, to be seen not only in the morning but during the day, persisted. He had strictures of large calibre at two and a half and at three inches from the meatus.

The endoscope, with electric illumination, easily revealed a chronic granular urethritis in the bulbous urethra, from which pus could be distinctly seen exuding. It was thought advisable to treat this diseased mucous membrane first, in order to avoid, if possible, the operation of internal urethrotomy. This was persisted in with some improvement, but with continual relapses, until the following February (1887), when, finding no further progress in his condition, I advised the division of the strictures, which was accordingly done, with the aid of cocaine. He was kept quietly in bed for six days, in order to foster the healing process in every way, but when he returned to his business there was immediately a very decided increase in his urethritis. This gradually subsided, however, without any special treatment, until he returned to his usual chronic condition of the morning drop of purulent matter.

After satisfying myself that his urethra was entirely free from stricture, I treated him most carefully and persistently (as you may judge) by means of the endoscope, until the granulations, which I have mentioned in his history, were entirely well. Notwithstanding this, the discharge continued. This led me to review his history, which developed the fact that at one time he had had some evidences of irritation of the prostatic urethra, and presumably of the membranous urethra, because it should be borne in mind that this disease travels backward by contiguity of tissue; and that, therefore, if the prostatic urethra is attacked, it may be assumed that the inflammation has travelled by way of the membranous. Although there were no special evidences in the discharge or urine, these regions were treated by the application of varying solutions of $AgNO_3$ until his sense of burning and tickling at or near the meatus had entirely disappeared. Nevertheless, the discharge persisted; he complained, moreover, of a burning sensation in the perineum,

which was especially aggravated after coition, and also by any condition of body which produced a urine of high specific gravity. Consultations with colleagues in regard to him did him no good. The examinations and suggestions were of no avail, and I simply made up my mind that it was necessary, in order to cure him, to fight it out according to my best judgment and with all the resolution that I could summon to my aid. Fortunately, he was a man of extraordinary good sense, and appreciated the difficulties of his conditions, was temperate and abstemious, and came regularly and systematically for treatment.

During this time, finding that there were no gonococci in the discharge, he was permitted to marry, and his wife has borne him one child. There was never the slightest infection of his wife or child, in regard to which I have been very cautious and have carefully inquired.

After obtaining a thorough knowledge of his urethra by the most careful and rigid inspection, I found that there was one particular spot which could only be brought into view by special manipulation of the endoscopic tube. A tube as large as the urethra would admit must be pressed firmly down into the bulb, the outer end depressed as if for the purpose of passing it on into the membranous urethra, so that the inner end would distend the bulb beneath the anterior layer of the triangular ligament, and in this way only could be brought into view a bluish-red spot of granulations, which were the cause of this man's tribulations. Solutions of $AgNO_3$, beginning with five or ten grains to the ounce, were applied at varying intervals of from one to two weeks. By close observation it was found that it was easy to overdo the matter in this case; that an application too strong or repeated oftener than once a week, or once in two weeks, would increase his discharge and put him back to a point from which it would again be necessary to advance him. It may be well to remark here that the applications to the deeper urethra could not be done in a hap-hazard or indifferent manner. With the finger in the rectum, the point of the syringe must be located directly upon the irritable or tender localities, and the instrument withdrawn gently and slowly, little by little, so that the solution could be applied minim by minim from one point to the other.

This man was continuously under my care up to this winter, when his discharge, which had gradually decreased in consistency and in the amount of pus which it contained, ceased entirely. At all events, he has been free from discharge, without relapse, for a longer period than ever before. It was only by attention to these details and by this persistency that this good result was obtained.

I will be glad to have any suggestions from this audience or any criticism upon the management of this case.

Again, there is a large class in which no stricture is present, but who have the same symptom,—*i.e.*, that of the morning drop.—which may readily be excited into a more abundant discharge by any act of intemperance or of sexual indulgence. In these, of course, the endoscope is again our reliable and effective means of ascertaining the condition of the urethra and of affording a way to treat it. But upon this it is not necessary for me to enlarge, for I assume that you are familiar with this instrument and also with the appearance of the urethra in its different parts. There is, however, another class of cases who have never had any tangible discharge from the urethra, but who suffer from symptoms of varying kinds of greater or less intensity, and whom we have been accustomed to place among the "neurotics," "hypochondriacs," etc., or perhaps have referred their symptoms to other causes. In my opinion these persons have a form of chronic urethritis, which, if recognized, will modify and facilitate treatment. Take, for instance, the following case:

A gentleman of 48 years of age, who has always been temperate, and who never had any venereal disease. About three years before coming under my care he had been circumcised for feeble erections, premature ejaculation, and for a "great sense of discomfort or burning," as he described it, somewhere in the deep urethra. The most careful examination failed to find any strictures. He had no hemorrhoids or any source of irritation about the anus or rectum; but his feeble erections, premature ejaculation, and the sense of burning and discomfort were still present. Repeated microscopic examinations of his urine were negative as to any organic evidence of prostatic trouble. But, as he had large deposits of uric acid crystals in his urine, I concluded that, given a man of nervous temperament and irritating urine, there was probably a sufficient degree of prostatic urethritis to account for his symptoms. Upon this hypothesis I proceeded to treat him. The passage of sounds

gave him comparative relief and some slight return of vigor in his erection. The correction of his urine aided somewhat, but still he had frequent relapses, and the burning and discomfort persisted. Applications of $AgNO_3$ to the prostatic urethra seemed to help also, but there was still a persistency of his symptoms, which led me to explore the deeper parts of the bulbous urethra with the endoscope. Here, much to my surprise, because he had never had any urethral discharge, or any evidence whatever of antecedent acute urethritis, were distinctly seen granular, bluish-red patches of irregular size. As cocaine was not used, these were found to be exceedingly sensitive; so sensitive that he could scarcely endure the gentle cleansing with soft pledgets of absorbent cotton, which was necessary in order to make the diagnosis definite.

Here, then, was the explanation of the continuance of this man's symptoms. I obtained from him a history of long and fatiguing horseback rides, for he had been a brigade commander during the war, and also an indefinite recollection that his troubles had begun somewhere about that time. Suffice it to say, seven applications of $AgNO_3$, not stronger than ten grains to the ounce, repeated at intervals of a week, together with one application of a few minims of a five-grain solution to the prostatic urethra, which, bear in mind, I had done before without avail, cured him. So far (six months) there has been no relapse.

You will observe, then, the order of events in this patient. No acute inflammation, but a subacute and chronic form of inflammation of the bulbous urethra, excited, no doubt, by the traumatism of a "life in the saddle," had disturbed the nerve relations of these parts to such a degree that his marital intercourse was imperfect, and he was kept in a constant state of irritability by small but persistent symptoms, and he was not relieved until this was discovered, and when discovered was rapidly and brilliantly cured.

In order to emphasize the necessity for classification, and to confirm the class which I have endeavored to establish,—*i.e.*, that there may be chronic urethritis, without antecedent or present discharge,—permit me to narrate the following:

This is a gentleman, aged 54, happily married, and has had several children. He remembers that about thirty years ago,—that is to say, when he was 24 or 25 years of age,—he had an attack of frequent urination, and that after urinating he had a sense as if there was more urine in the bladder. This disappeared, and he had no trouble until the year 1888, when the same thing made its appearance again. He was examined by a distinguished surgeon of Philadelphia, who found no stone nor any residual urine, and advised him to have large sounds introduced. This was done, but his urethra was so sensitive, and he suffered so from the first attempt, that thereafter the sounds were passed under the anæsthesia of nitrous oxide gas. The passage of sounds made him worse, and his attacks of frequent and slightly-painful urination recurred so often that his life was miserable, and he was also incapacitated from attending to his business. He gave me a perfectly straightforward history of masturbation occasionally from boyhood up to twenty-four years of age. He had never had illicit intercourse, but just before the first one of these attacks—thirty years ago—he admitted having had prolonged sexual excitement in relation to a young lady to whom at that time he was very attentive. This sexual excitement was frequently repeated, and was soon followed by the symptoms of which he complained. He married in about a year after, and his married life has been physiological and satisfactory.

When carefully examined, his urethra was found to be entirely free from stricture, but the prostatic urethra was excessively sensitive. Gentle pressure upon it by the rectum made him cry out, and some seminal fluid escaped from the meatus. He had no residual urine. He was a man in excellent general health, temperate in all his habits, in very comfortable circumstances, and he was at a loss to account for this recurrence of the symptoms after so many years.

Examination of his urine at repeated intervals showed a very decided tendency to lithæmia, and I obtained from him the history of an attack of nephritic colic and the passage of gravel in May, 1887, about a year before this present trouble began.

The endoscope, when introduced into the bulbous urethra and manipulated as I have described to you in the first case, revealed a mucous membrane decidedly hyperæmic in irregular patches. These were treated with applications of $AgNO_3$, five grains to the ounce, and almost immediately—*i.e.*, after two applications—my records say that he was "very comfortable," but an attack of cold, with "aches and pains all over," producing a condition of urine of high specific

gravity, caused a relapse in his symptoms. During this attack I made no application to his urethra, but gave him salicylate of sodium internally. After a few days of this treatment I again explored his urethra with the endoscope, and had the satisfaction of seeing the patches to which I have referred, and which had become pale and almost level with the surrounding urethra again, bluish-red in color, and distinctly elevated. Treatment was resumed, with the same happy result of rendering him immediately less irritable and with no complaint in regard to his bladder. This gentleman entirely recovered, but he evidently has a constitutional tendency to lithæmia, and if his urine becomes loaded with crystals, it immediately irritates his mucous membrane, and he has a return of his old sensations to a moderate degree. For months I have not been obliged to make any application to his urethra, but have relieved him by attention to his diet, by encouraging a little more exercise in the open air, and by the exhibition of alkalies between his meals.

The points in this case are somewhat similar to the other, but permit me to call your attention to what seems to me to be its order of events.

The habit of masturbation induced a hyperæmia of the bulbous and prostatic urethra. This was aggravated and intensified, by the sexual excitement of early manhood, up to the grade of a mild inflammation, which was manifested by the frequent and painful urination. Marriage relieved him, but later in life the uric-acid urine again irritated his "weak spots," and again a mild form of inflammation appeared, which was proven by ocular inspection and by the presence of a few leucocytes in his urine. The nervous element was now, at his age, a prominent feature, and he suffered more and more persistently, notwithstanding the internal medication, diet, etc., till the local conditions in the urethra were ascertained and treated.

31 East Forty-fourth Street.

CARBOLATE OF CAMPHOR.

By M. B. Cochran, M.D., Iowa City, Iowa.

In the December number of the Gazette for 1887, I called attention to a mixture of Japan or laurel camphor and crystals of carbolic acid, under the above name, and gave some account of the therapeutic uses to which I had applied it. Dr. Th. Schaefer called attention to this preparation in 1885, under the name of "phenol-camphor," and used it as a local anæsthetic in odontalgia, introducing it, on cotton, into the cavity of a carious tooth; also as an anæsthetic in ingrowing toe-nail. He also used it in certain cutaneous eruptions, due to cryptogamic causes.

The above is the only notice of it, so far as I am aware, until my article appeared in 1887, and at that time I had not seen the article of Dr. Schaefer. Since that time, however, I have seen various notices of it in different medical journals, and accounts given of the uses to which it has been applied. I prepare it by adding one part by weight of carbolic acid to three parts of camphor, setting it aside for twenty-four hours, and straining through gauze. It is a permanent liquid, having a specific gravity of 990. It is thoroughly antiseptic, and possesses unsurpassed germicidal powers. I dipped a piece of fresh meat (beef muscle), a square, weighing about two ounces, in carbolate, and then placed it in a bottle, closing the mouth with cotton, then placing the bottle in an east window, so that it was exposed to the sun's rays from the first of June until August, or until it was dry. No odor or indication of putrefaction was at any time perceptible. I impregnated gauze and cotton with it, and used it as a dressing for wounds after operations. It prevented suppuration in every instance when it could be well applied, but I found that if applied to the skin for several days without dilution it gave rise to an eruption of the surface, and that it was necessary to mix it with oil for continued external use. I have injected it with a hypodermic syringe into acute abscesses or boils with the effect of aborting them if suppuration had not begun, and of relieving the pain of them in every instance.

When a few drops are injected under the skin, it produces complete anæsthesia in the immediate parts which lasts for several hours. Some soreness of the surrounding parts follows, but no abscess. A sharp smarting is felt at first, which only lasts a moment. A little ether or alcohol (pure) should be added to it for hypodermic use, so that it will readily flow through the needle. It combines readily with alcohol, ether, fixed and essential oils, and petroleum derivatives, but *not* with aqueous solutions or *glycerin*.

It readily dissolves menthol, cocaine, sali-

cylic acid, iodoform, chloral hydrate, and mercuric chloride.

When given internally in capsules, in doses of from 5 to 10 drops, it produces a sensation of warmth of the stomach not disagreeable, and giving rise to camphoric eructations, which continue for from one to three hours. When applied to inflamed or ulcerated mucous surfaces, such as the tonsils, pharynx, or cervix uteri, it causes smarting for a moment, and then relieves existing pain, and acts as an antiseptic stimulant.

When rubbed upon the skin, it produces an agreeable warmth of the surface that continues for a considerable time.

When mixed with an equal quantity of cotton-seed oil, it forms one of the most agreeable antiseptic dressings to incised, lacerated, or contused wounds that I have ever used, preventing suppuration always. When properly applied upon gauze or absorbent cotton and kept in contact with the wounded tissues, and when suppuration has set in, it changes the character of the discharges completely, destroying all fœtor if well applied, and relieving pain and soreness sooner than anything that I have ever used. As a lubricant in massage, it is unsurpassed, especially in contracted muscles and stiffened joints. In herpes and erysipelas, when applied to the diseased skin with a soft brush, it has acted as a specific, relieving the pain and causing a healing process to be set up at once. In one case of the latter affection in a child 3 or 4 weeks old, that seemed about hopeless, I was called in consultation, and advised the use of one part of carbolate and *two* parts of pure olive oil, brushed over the face every three or four hours. The whole upper part of the face was so swollen that the ocular spaces of the face were full, the eyes had not been seen for two days, and the lips were so swollen that it was fed its mother's milk with a spoon, in very small quantities, and the disease was advancing over the scalp. The disease was checked from the first application, and in twenty-four hours a marked change had taken place for the better, and continued to recovery. In vaginitis, vulvitis, and pruritis vulvæ, when applied to the vagina on cotton, which is kept in place for twenty-four hours, it relieves the distressing symptoms at once. After parturition, if a small quantity is poured on the cloths that are applied to the vulva to take up the discharges, it will destroy all disagreeable fœtor and relieve the soreness in very little time. Of course strict cleanliness should be observed, and changes made as often as necessary. In cases of frost-bite, applied on cotton to the injured surface, and changed as often as needed, it is unsurpassed. It relieves the pain and dries up the blistered skin. In fact, it can be applied anywhere when an unirritating antiseptic dressing is required. I have used it uncombined in capsules, in cases of gastric and intestinal catarrh, with the best results.

In the London *Medical Recorder*, Dr. R. S. Smith reports two cases in which he used it, first, as a subcutaneous, and then as an intrapulmonary, injection in phthisis. He injected from 10 to 20 minims of the carbolate of camphor into the apices of the lungs, repeating it at first every two or three days, and afterwards daily.

He first used subcutaneous injections, but the patients preferred to have them injected into the lung-tissue, as it was less painful. About fifty injections were used in the course of ten weeks in the first case. In the second, the whole quantity injected in twenty-five days was 245 minims, 60 minims having been diffused in the diseased tissue of the right lung. A slight rise of temperature was observed after the injections in one or two instances, but no other evidence of irritation was noticed. Both cases improved greatly under treatment.

I use it in preference to anything else to render instruments aseptic before using them. It does not corrode steel, and covers the surface completely, if they are immersed in it when free from moisture.

INTESTINAL PILLS.

By Wm. H. Flint, M.D., New York.

ABOUT six months ago I addressed an inquiry to Messrs. Parke, Davis & Co., of Detroit, Michigan, concerning their ability to prepare pills in such a way that they should pass through the stomach undissolved, and should yet be disintegrated by the alkaline juices of the duodenum.

In response to my request they have kindly furnished me large numbers of pills which I have thoroughly tested, both in my private practice and in the hospital with which I am connected in the capacity of attending physician.

Creosote was selected as the active constituent of these pills, because, at the time

when my request for this preparation was made, I was deeply interested in investigating the effect of creosote in *phthisis pulmonalis*.

It seemed to me that the best results were obtained, in phthisis, from the action of creosote when it was administered in the largest doses which the individual patients could respectively tolerate. Since, however, many consumptives have notoriously feeble stomachs, which soon rebel against large doses of creosote, the desirability of distributing the labor of their solution and absorption over a larger part of the digestive tract was plainly apparent. My inquiry into the action of the enteric or duodenal pills has occupied a long time, because I wished, by an extended series of observations, to exclude, so far as possible, all sources of error in forming my conclusions. My studies have been further protracted by the fact that the pills which have recently been furnished are so far superior to those originally sent me as to necessitate the entire revision of my earlier work. Although I have subjected the pills to the action of various reagents in the laboratory, particularly to artificial gastric juice and to alkaline and acid solutions of varying composition, strength, and temperature, I have chiefly relied upon the clinical method in testing the merits of the pills.

The essential qualities of enteric or duodenal pills really deserving the name, being resistance to the solvent action of the gastric juice and ready solubility in the intestine, I have subjected these pills to the action of the stomach, both when it was empty and at various times during the process of gastric digestion, and have also studied the behavior of the pills in the presence of the intestinal juices. I may precede my remarks regarding the action of the stomach on the pills by calling attention to the fact that a pill if held in the mouth from one to one and a half hours, and particularly if gently moved about by the tongue, is gradually deprived of its coating and is then slowly dissolved.

In one series of my experiments the emptiness of the stomach having been first insured by thorough lavage, the pills have been ingested and saliva has subsequently been swallowed. In these cases the stomach tube has, after an hour or two hours, withdrawn the pills partly dissolved, the accompanying fluid smelling and tasting of creosote. In other cases of the same series, the washings here show no trace of the pills and no odor or taste of creosote.

In another series of experiments the pills have been taken into the empty stomach with a few swallows of pure water, and the syphon tube used after an hour or two hours. In some of these cases no trace of the pills has been found in the liquid withdrawn, and no odor or taste of the creosote has been perceived.

In other instances, notably when the subject of the experiment has been made to assume a position on the left side in order to antagonize the gastric peristole, the pills have been returned in a partly disintegrated state. The reaction of the liquid in these cases has been sometimes alkaline and sometimes neutral. In a few cases of atonic gastrectasia, the pills having been introduced into the stomach early in the morning, before breakfast, and the patients made to assume a position upon their left side, the fluid withdrawn, after an hour's interval, has contained a large percentage of bile, which had evidently gravitated through the relaxed pylorus, and the pills have been returned partially dissolved. The experiments thus far described have served to prove the ready solubility of the pills in stomachs containing alkaline media as well as to inferentially demonstrate their solubility in the menstrua actually present in the intestine.

In order to test the behavior of the pills during gastric digestion, they were, at first, given in a series of cases at varying intervals after a trial meal consisting of hot water and white bread. In these cases no trace of the pills and no odor of creosote could, as a rule, be found in the matter withdrawn from the stomach an hour or two after the trial meal; and when they *were* detected there was reason to suppose that the gastric digestion of the subjects of the experiments was defective and that the fluids of the stomach might, on that account, have remained alkaline or neutral during an unnaturally long portion of the digestive process. My failure to obtain any trace of the pills in most of these instances may be ascribed to various causes. In the first place, the orifice of the stomach-tube, through which the gastric contents were withdrawn, although the tube was the largest size in the market, may still have been so small as to prevent the easy entrance of the pill into the tube; again, the tube may not have reached the lowest point of the stomach's greater curvature, to which the pill would, usually, have gravitated if still undissolved, and some of the contents of the stomach may, therefore, have remained in the organ. In some instances the pills may have remained

adherent to the gastric mucous membrane and have thus failed to gain entrance to the tube. Finally, it is quite possible that the pills, being smooth and slippery, have stolen through the pylorus before the chyme, or with the first instalments of that fluid.

The indecisive character of the above results led me to early abandon the plan of withdrawing the trial meals and to substitute a method by which the movements of the pills could be more surely followed and their condition, at various stages of digestion, be more accurately ascertained.

This method consists in introducing pills securely attached to a suitable cord, or enclosed in thread nets, into the stomach at different periods after meals, and in withdrawing them after varying intervals, in order to ascertain whether the pills have undergone changes during the process of gastric digestion.

The length of the cords used has been about twenty-six or twenty-eight inches. The best thickness of the strings seems to be that of ordinary twine. A thread finer than twine cuts the coating of the pills, thus vitiating the results of the experiments. Early in the course of my studies into this subject, I abandoned the thread nets because the threads were, of necessity, so fine as to cut the coating of the pills quite as deeply as a single fine thread. The pills, having been carefully weighed and attached to the cord, have generally been covered with vaseline, to facilitate their deglutition and to render them still less vulnerable to the attacks of the gastric juices. After the pills have been swallowed, a little loop left in the proximal end of the string has either been caught over a tooth or deposited between the teeth and the cheek, in order to prevent this extremity of the cord from being swallowed. The subjects of these experiments, among whom I count myself, have then been allowed to go about their business, returning at a given hour in order to have the pills withdrawn, examined, and weighed. Beginning with intervals of one quarter hour the writer has gradually increased the period during which the pills have remained in the stomach up to five hours. It has not seemed necessary to extend this period because the gastric part of the digestive cycle has generally been completed and the chyme propelled into the duodenum before the expiration of five hours. The writer intends, however, to investigate the fate of pills left for a still longer time in the digestive tract, and hopes to eventually report upon the condition of such pills as, having passed the pylorus, have been withdrawn after sojourning during varying periods in the small intestine.

It affords me great gratification to now report that no change has been observed in the great majority of pills which have remained in the stomach for periods of time varying from one quarter hour to five hours.

In proof of this assertion, I have in my possession some of the pills withdrawn by myself, in a perfectly sound condition, at intervals after their introduction varying from one quarter hour to five hours. My present method of testing the pills is so simple that any one to whom these pills may be furnished can verify my statements for himself. The writer, however, desires to caution any one who is about to undertake such experiments not to introduce the pills into the stomach until sufficient time has elapsed after a meal for the alkalinity of the saliva to be neutralized by the generation of lactic or of hydrochloric acids in the organ. He would recommend that the pills be administered midway between meals in order to insure their remaining intact until the contents of the stomach pass into the bowel. In order to ascertain whether the enteric pills are dissolved in the intestine, I have caused the stools of patients taking the pills to be carefully examined, both for traces of the pills and for the odor of creosote, but with invariably negative results. The ready solubility of these pills in the intestine seems further demonstrated by the fact that the constitutional effects of creosote have been observed in all the phthisical patients whose cases I have studied during these experiments.

The conclusion reached by the writer as the result of his studies is that the enteric pills which Messrs. Parke, Davis & Co. now furnish are practically insoluble in the stomach within the normal period of gastric digestion, unless administered when the contents of that viscus present an alkaline or a neutral reaction, and that they are readily dissolved in the alkaline fluids of the small intestine.

If this conclusion is well founded, there has been added to the therapeutic armamentarium of the medical profession a weapon of incalculable value. By means of these enteric pills many substances which, given in the ordinary ways, unduly irritate the gastric mucous membrane, like creosote or salicylic acid, and those medicaments designed to exert a local action in the small intestine, such as anthelmintics, intestinal antiseptics

and astringents, may be directly conveyed into that viscus.

Parke, Davis & Co. have kindly volunteered the information that these pills were coated with an alcoholic solution of shellac containing just sufficient balsam of Peru to give the final investment a suitable degree of elasticity. I am informed that this coating, which in practice has proved so satisfactory, represents the results of a long and tedious series of experiments on the part of the analytical department in the laboratory of the house in question.

I am desirous that the attention of the profession be called to these pills as soon as possible, in order that other physicians may test them for themselves, and in order that the full credit for their discovery and preparation may be given to Messrs. Parke, Davis & Co.

37 East Thirty-third Street.

CUPRIC ARSENITE IN THE TREATMENT OF LIENTERIC DIARRHŒA.

By A. F. Hinz M.D., Idalia, Colorado.

SINCE the publication of an article in the July (1889) number of the Therapeutic Gazette, by Dr. John Aulde, of Philadelphia, on the remedial action of arsenite of copper in the treatment of cholera morbus, several confirmative notes in answer to his paper came under my observation.

I cannot find any mention of the use of arsenite of copper as a remedy previous to the one of Dr. Aulde. The drug known in commerce as Sheele's green is in the form of a green powder, composed of one part of arsenious acid and two of oxide of copper. It is soluble in ammonia and nitric acid, and yields crystals of arsenious acid by sublimation.

His first report, dating back to the September number, 1888, of the *Medical Register*, gives the result of its use in twenty cases, in patients from 1 to 60 years old, and varying, as he states, from simple colicky pains to diarrhœa and vomiting of several days' duration, and one case of acute dysentery with profuse bloody discharges from the bowels, and in every instance the treatment proved eminently successful; not a single failure occurred, and, as a rule, the pain and tenesmus subsided after the first hour, after taking the first five doses. In his last paper he confines his observation to cases of bowel affections, which occur most frequently during the summer months, with equal results.

Such remarkable results would naturally place the drug in the list of reliable remedies of our materia medica. And, as usual, his paper was quickly followed by enthusiastic reports of cases which, after all other remedies had been tried in vain, yielded promptly to the action of the arsenite of copper.

My own experience with the drug is limited to only a few cases. I have had but a few cases of cholera morbus since reading the article above mentioned, and most likely have not had a good opportunity to give it a just trial, as I always had used other remedies first, not having the drug in my case for immediate use. The reports of the patients were favorable, even those of long-standing diarrhœa. I am inclined to have confidence in its action, and shall use it exclusively in my next case. Of course, it would seem that nothing could be more prompt than a hypodermic injection of morphine, but I believe the effect on the bowel is better and recovery quicker with the administration of the arsenite of copper.

Of the curative action in lienteric diarrhœa I am convinced, since that disease does not run its course and recover naturally. I have had two typical cases, following long-standing dyspepsia, which I am positive were cured by its use. The idea of its administration in that class of alimentary disease was suggested to me from the fact that arsenic acts favorably in some cases of this kind, as well as by the experience of Dr. Aulde in the treatment of other forms of bowel affections.

The cases under consideration are those of two females, aged 50 and 57, respectively, both suffering from dyspepsia of the worst form in the last fifteen to twenty years. It is the last case I have particular reference to, since I intended to use the drug from the start, and I watched its action carefully. The patient all her lifetime has been a subject of extreme constipation in connection with dyspepsia; however, several months before I was called the diarrhœa had made its appearance. Regularly upon rising in the morning she would have five to ten passages, the first containing undigested food, the others consisting chiefly of mucus and water. The same would be repeated in the afternoon, or any other time during the day, especially after eating. All the domestic remedies available were ineffective, and she would not listen to her husband's urging her to em-

ploy medical advice, having had her confidence entirely exhausted in years of unsuccessful treatment of her dyspepsia; but matters became so alarming to her that she finally consented. She was greatly emaciated and confined to bed when I first saw her. Food of any kind would distress her, and she actually abstained from it altogether for fear of the pain and effect upon the bowels. The eructation of gases from the stomach was at times so frequent and severe that the patient from all appearances was suffocating. Vomiting seldom occurred, and, if it did, with extreme difficulty.

The object of my treatment was to stop the diarrhœa without employing astringents. With that object in view I gave digestive agents, bismuth and alteratives, and carefully-selected diet, especially milk. She could retain some food without such great distress, but the bowels did not yield in the slightest degree. The occasional use of injections and astringents would stop the frequent passages, but there was no inclination towards a cure. I commenced the use of the arsenite of copper about two weeks after beginning the other treatment. The strength of the solution used was 1 grain of the triturate, as given by Dr. Aulde, to 3 ounces of water, a teaspoonful every hour the first day, and four times a day every succeeding day. In connection I continued the following prescription to aid digestion:

℞ Acid. nitromuriat. dil., ʒiii;
Pepsin. sacch., ʒvi;
Bismuth. subnit., ʒiv;
Ext. fld. nucis vom., ʒi;
Hydrastis, ʒiii;
Glycerini, ʒvi;
Aquæ, q.s., ʒviii.
Sig.—Two teaspoonfuls with every meal.

The improvement was apparent a few days after the arsenite had been administered, not abruptly like the strong astringents, but gradually, the stools lessening about one or two a day, and digestion as well as assimilation improving gradually and slowly. The other case was similar to the one reported, only I waited longer before employing the new remedy. It is very conceivable to me that the mild astringent action of the minute doses of the copper, combined with the alterative action of arsenic, cure the constantly irritated bowel.

The hydrastis in the prescription would also act soothingly on that organ. The bismuth protects it from undigested particles, and the pepsin, with the acid in proper quantities, will do the digesting. No other treatment besides milk and other easily-digested food is necessary. Pepsin especially should be of a good quality.

For medicinal use, the arsenite of copper, according to Dr. Aulde, is prepared as follows: A triturate of one part of arsenite of copper to one hundred parts of sugar of milk is finely prepared. One grain of this dissolved in water makes a very convenient form to exhibit the drug. Tablets as prepared by manufacturing chemists are still more convenient for the ready use of that remedy.

DR. KOCH'S REMEDY.

By Karl von Ruck, B.S., M.D.,* Asheville, N. C.

THERE has already appeared in the medical and public press of this country a profusion of articles regarding the specific treatment of tuberculosis by Professor Koch's method, although little actual experience exists on this side of the Atlantic. It is not my intention to reiterate what has already been said many times over, or to report my cases treated, with so many injections of so many milligrammes each, and describe each reaction, but to add simply a few words of caution.

Although I have seen no unfavorable complications, and my cases are all apparently following a typical course, with more or less improvement, I must mention one case with tubercular infiltration of the larynx, which, after the initial injection of .3 milligramme, reacted severely in two hours, with so much swelling in the larynx that the respiration for a short time became seriously impeded. Inasmuch as 1 milligramme is recommended by Koch himself as an initial dose, and the reaction is always intensified with increasing doses, I have no doubt I should have had complete stenosis had I not given the unusually small trial dose, which has since been my rule in every case having any deposit in the larynx. This patient has since received additional injections, and has reached .004 without again showing such alarming symptoms, and is evidently improving.

Another matter requiring care is, that the reaction may occur at night-time, when the patient is asleep, and may be accompanied by stupor; and close personal and frequent ob-

* Director Sanitarium for Diseases of Lungs and Throat, Asheville, N. C.

servations must be made for at least twenty-four hours if no reaction has occurred, so that it will not escape notice and lead to an increase and repetition of the dose, which then may produce dangerous symptoms.

I have one case under treatment in which each injection has been followed by profound sleep for from three to four hours, yet the other symptoms of reaction, including fever, are very slight. A third matter I had already considered seriously when making my studies in Berlin. I noted there in Koch's method what seemed to me much more of a routine procedure than I have been in the habit of witnessing in the employment of therapeutic agents by our usually discriminating and cautious German colleagues during my former years of study and subsequent visits to the German medical centres.

I found that in many instances the injections were repeated daily, and, as a rule, every other day, and that under such management the patient kept his bed constantly and lost much in his general condition, until reactions no longer followed the employment of the lymph.

Even early-stage cases lost flesh quite regularly, and the advanced cases seemed, with few exceptions, to bear the treatment very badly.

Now, I have my doubt of the correctness of any procedure, especially in consumption, under which the patient's general nutrition suffers materially in steadily losing in flesh and strength; and, before I had been in Berlin many days, I was fully resolved that I would avoid this, if possible, in my applications of this remedy. I was, therefore, agreeably surprised and much pleased to find, on a short visit to Dr. Dettweiler, the director of the institution for consumptives at Falkenstein, that he had abandoned the rapid succession of the doses, and is now allowing his patients several, and often five or six days for recuperation after a severe reaction is passed, and, as he expressed it, "with the happiest results," his patients no longer losing but regularly gaining in flesh and strength. Neither had he given up climatic treatment and other management heretofore found beneficial, but insisted upon these measures as much as ever.

My experience entirely coincides with his, and so far the local effects, as also those upon the symptoms, cough, expectoration, number of bacilli, etc., are in my cases, as in his, as favorable as I have observed in Berlin, where the treatment was repeated much more frequently.

In the mean while, I have no doubt that here, as at Falkenstein, the climatic treatment and general management is an important aid, and it is not in the interest of health resorts when I point out that, whenever possible, the specific treatment should be carried out under the most favorable climatic and other conditions, tested by years of experience to be useful in exercising undoubted curative influences. This should commend itself to the good judgment of any thoughtful observer; and under such management many even somewhat advanced cases may receive the treatment with benefit.

TREATMENT OF SYPHILIS BY MEANS OF INTRAMUSCULAR INJECTIONS OF THYMOL OF MERCURY.

DR. SCHLEICHSZADEK (*Bulletin Général de Thérapeutique et de Clinique*, December 13, 1890) has experimented with this remedy in cases of recent or inveterate syphilis. The formula which he employs consists of 1½ parts of the thymol of mercury, ½ part of mucilage of gum arabic, and 20 parts of distilled water. The injections are usually performed every three or four days, preferably in the gluteal region.

Eighteen cases were so treated, the treatment in one lasting for forty-two days, the others for twelve days. Usually he found that after two or three injections exanthematous irruptions commenced to disappear, while after the fourth injection the ulcers were well advanced towards cure. Usually macular exanthemata of recent date only required four to six injections, while papular efflorescences only completely disappeared under six to eight injections.

Through the aid of these injections squamous and pustular affections of the most chronic cases and even specific cutaneous affections disappeared with more rapidity than could have been affected through the employment of other mercurial preparations.

He also claims to have obtained a most remarkable curative action in syphilitic laryngitis with complete aphonia, and the symptoms rapidly disappear after the first injections.

Finally, the author claims that these intramuscular injections have never been followed by any local inflammatory action nor induration or abscess, while stomatitis occurred but rarely, and was then, in no case, severe.

The Therapeutic Gazette

EDITED BY
ROBERT MEADE SMITH, A.M., M.D.,
Professor of Comparative Physiology, University of Pennsylvania,
PHILADELPHIA.

GEO. S. DAVIS,
Medical Publisher, Box 470,
DETROIT, MICH.
Philadelphia, 714 Filbert Street.

SUBSCRIPTION RATES FOR 1891.

(Journal increased to 72 pages each month.)

THERAPEUTIC GAZETTE (postage included).....$2.00
THERAPEUTIC GAZETTE with MEDICAL AGE..... 2.50
THERAPEUTIC GAZETTE with AMERICAN LANCET 3 25
THERAPEUTIC GAZETTE with AGE and LANCET... 4.00

Foreign subscriptions may be ordered through our agent in England, Mr. H. K. Lewis, Medical Publisher and Bookseller, 136 Gower Street, London. Price 10s. Remittances may be made either by Postal Order or Stamps.

Price to Foreign Subscribers direct (postage included), $2.50 (10 shillings). English postage-stamps received on remittances.

Editorial communications should be addressed 332 South Twenty-first Street, Philadelphia. Articles intended for the Original Department of the GAZETTE will be accepted only with the understanding that they are contributed to it exclusively.

Authors will receive reprints in pamplet form, without charge, provided the request for them be written on the articles sent.

Business communications should be addressed to the Publishers.

Leading Articles.

THE USE OF STIMULANTS IN FEVERS.

THE antiphlogistic treatment of fevers in vogue in the early part of this century, under the lead of clinicians like Bouillard and Broussais, has given way to the supporting and stimulating system as taught and practised by Graves, Stokes, Todd, and Bennett in England; still later by Broadbent, Beale, Anstie, Murchison, Flint, Jurgensen, Liebermeister, Germain Sée, and hosts of other clinical leaders in all lands.

To repair the excessive losses incurred by the combustions of the febrile process, nutrients are indicated; and experience has shown that, while the digestion of solid food is imperfect or impossible, liquid aliments, as milk and broths, are absorbed with considerable readiness, and sustain the vital forces and diminish waste.

The exhibition and management of stimulants in fevers require no little tact, experience, and judgment. Doubtless mild cases may do very well on milk and broths, without a particle of alcohol from the beginning to the end of the fever. Some, as Jaccoud, give wine or other alcoholic potions indiscriminately to all their typhoid patients, the quantity varying as to age, constitution, and habits of the patient. Others wait for symptoms of general depression and heart-failure. The part of wisdom would seem to be, neither to give alcoholic stimulants altogether as a matter of routine, for some fever patients do not need them, and really do better without them, nor to wait for marked manifestations of depression before giving wine or brandy.

Stokes, in his admirable "Lectures on Fever," dwells at some length on what he calls "the anticipative treatment," by which is to be understood the administration of stimulants at an early stage of the fever, when, "although there may be no very pressing vital symptoms calling for their use, the sagacity of the physician enables him to foretell the occurrence of great prostration of vital energy." He believes that this anticipative method is that which will most conduce to the saving of life. By the early exhibition of alcohol, we follow the old maxim, "Venienti occurrite morbo." Stimulants are given to guard against a sudden sinking of the vital energy, shown by special conditions of the nervous and the circulatory systems. In determining on the employment of the anticipative treatment, the epidemic character or habit of the disease must be taken into account. If, for example, it is known that in the epidemic a great number of cases assume well-marked symptoms of prostration, say on the seventh, eighth, or ninth day, the physician will on the fourth or fifth day anticipate their occurrence by commencing the use of stimulants. The antecedents of the patient, his habits of life, his previous health, etc., will also furnish indications as to the advisability of beginning the anticipative treatment. Stokes has found that in typhus fever the anticipative treatment is more frequently called for than in typhoid.

In the aged and debilitated, when attacked with pneumonia, typhoid, or any other febrile disease of more than ephemeral duration, the expediency of early beginning a stimulating treatment is everywhere recognized. The attending physician will be very chary in the use of veratrum or antimonials, and will from the very first order some wine or brandy, in such doses as will in his judgment sustain the heart and nervous system. Unfortunately, such persons are bad subjects for pneumonia or typhoid, and will often sink about the sixth or seventh day, despite the most careful supporting treatment.

Among the "classic" signs indicative of the necessity of stimulants, we have the dry, brown tongue, sordes in the mouth, stupor or subdelirium, coldness of the surface, a peculiar fever odor, often present from the first, feebleness and irregularity of the heart's action. The quick, soft, compressible, wavy pulse calls for alcohol. Perhaps no better rules based on the condition of the heart can be formulated for the administration of stimulants than those which Stokes has laid down in the work before referred to. The following, according to him, are the physical signs which seem to indicate the early use of stimulants:

1. Early subsidence of the first sound, observed over the left ventricle.

2. Diminution of the first sound over the right ventricle.

3. The heart acting with a single, and that the second, sound.

4. Both sounds being audible, but their relative intensity being changed, so as to represent the action of the heart of a fœtus *in utero*.

5. With these signs, a progressive diminution of impulse, which occasionally becomes imperceptible, even when the patient lies on the left side.

As to the quantity of alcohol to be administered, everything will depend on the condition and previous habits and idiosyncrasies of the patient. An adult male patient, about the fifteenth day (or about the time of crisis) of typhoid fever, with nervous and circulatory symptoms, indicating a tendency to sinking, will often bear enormous quantities of alcohol, and it is not an uncommon event for patients in this condition to be dosed to the extent of a quart of wine and a quart of brandy in the twenty-four hours. The most judicious practitioners are disposed to exercise moderation in alcoholizing patients, even in states of asystolism, and believe that nothing is gained by exceeding an ounce of good whiskey or brandy per hour; if this will not save life, more will be inefficacious. It cannot be too much remembered that in giving alcohol to fever patients we are adding another poison to the blood, and that the patient may be as much endangered by excess as by lack of alcohol.

As to the preparation of alcohol to be chosen, the practitioner must be guided by the idiosyncrasies of the patient and the degree of prostration. Some persons do better on wine than on any other stimulant; this is often the case with delicate females and with children. In states of prostration, whiskey or brandy is the most likely to arouse and sustain the flagging forces. Whatever alcoholic preparation be chosen, the physician cannot be too careful as to the *purity* of the spirituous liquor administered; new liquors are to be shunned, and only samples of rum, whiskey, or brandy admitted to the sick-room that are at least five years old, and have been kept that length of time mellowing in the cask. The importance of this precept is sufficiently obvious to all who have had any experience in the selection of liquors of good quality for medicinal usage.

SABURRAL FEVER AND ITS TREATMENT.

IN these days of specific fevers and bacteriology it is well to remember that there are other fevers besides typhoid, and other causes of disease besides microbes. The young graduate fresh from the hospital and from lectures will possibly be well posted in the symptoms and treatment of everything but those forms of disease which he will be very likely first to encounter. His first case of "typhoid" (?) will perhaps prove to be simple gastro-enteritis, "catarrhal fever," or acute indigestion. Rendon has shown the exceeding probability that there are fevers due to overwork (*surmenage*) and the accumulation in the economy of waste extractive matters;* and Talamon has again called attention to the exceeding prevalence of fevers of a continuous or remittent type, due simply to morbid conditions of the stomach;† the product of vicious fermentations, or, what is perhaps more probable, poisonous ptomaïnes of microbe origin generated in the alimentary canal being absorbed into the blood in a more or less intermittent manner, acting on the thermogenetic and other nervous centres, and causing symptoms of a very pronounced though seldom dangerous character. The old writers gave to this pyrexial disease the name of "saburral fever," indicating by the epithet *saburral* that they believed it due to foulness of the stomach,—*i.e.*, an accumulation of saburræ in that organ. The French names *embarras gastrique*, *état saburral* are synonymous.

The facts do not warrant the hypothesis that saburral fever is acute catarrh of the

* "Les Fièvres de Surmenage," Paris, 1888.

† "Études Médicales," Paris, 1881, p. 584.

stomach (as some have maintained), or an abortive typhus (Liebermeister). The symptoms are subordinate to the gastro-intestinal derangement. The disease begins with loss of appetite (which may be gradual); the tongue is large, white, and dirty; the mouth clammy; the breath fetid; constipation is habitual; the patient is languid, feeble, and has no aptitude for work; the discomfort augments after each attempt to take food; then febrile paroxysms, preceded by chills and followed by sweating, set in. Sometimes hepatic symptoms, such as jaundice and enlargement of the liver, are present. All the morbid phenomena improve under the judicious use of saline purgatives frequently repeated.

These patients, as Lecorché and Talamon remark,* are generally persons who suffer more or less habitually from bad digestion. Under the influence of overwork, emotion, exposure to cold, etc., there is arrest of digestion; nausea and vomiting, headache, chills and fever supervene. The supposition of putrid fermentations in the stomach and intestines, and the absorption of the abnormal products of digestion, with poisonous ptomaïnes elaborated by microbes, will explain the symptoms better than any other hypothesis.

In children, convulsions often usher in and accompany the disease, as an expression of the general toxæmic condition.

The duration of the disease is variable; it may last with a nearly continued fever for a week, or even longer, resembling a mild typhoid. In other cases, after one or more attacks of chills followed by fever, profuse evacuation—the result of medicine, or supervening spontaneously—may set in, and convalescence may rapidly take place.

The treatment should be such as is calculated to promote thorough cleansing and antisepsis of the alimentary canal. There can be little doubt as to the propriety of an emetic of ipecac at the onset. This may be followed by a "c. cum j." purge, or by three of the *pil. cathartica co.*, a full dose of Hunyadi or Rubinat water being given the next day. In no disease is the efficacy of judicious purging more conspicuous. There is generally constipation from the first; even when there is diarrhœa, the natural evacuations may be insufficient, without the aid of daily saline cathartics, to clear the alimentary canal of offending products.

* "Études Médicales," p. 586.

There can, moreover, be no doubt as to the utility of disinfecting the digestive tube by the administration in suitable doses of such antiseptics as naphthol, naphthalin, salol, salicylate of sodium or bismuth, charcoal, etc.; the diet should be light and bland consisting principally of milk-and-water gruel.

CHLORALANTIPYRIN.

HYDRATE OF CHLORAL combines with antipyrin to form two well-defined compounds, the one containing one molecule of the hydrate of chloral and one of antipyrin, or the so-called monochloralantipyrin; the other containing two molecules of hydrate of chloral and one molecule of antipyrin. If concentrated solutions of hydrate of chloral and antipyrin in water are mixed (the antipyrin being in excess), an oily substance is produced, which settles to the lower part of the mixture, and, when allowed to stand for some time, crystallizes. This substance, which is monochloralantipyrin, and whose existence has been recognized for some time, was the cause of the statement of certain pharmacologists that antipyrin and chloral are incompatible. Chemical analysis shows that these crystals form a true chemical compound, the composition of which is one molecule of antipyrin and one molecule of hydrate of chloral, though yet the individual characteristics of antipyrin and chloral are not lost. Thus, a red color is formed with the perchloride of iron, the characteristic sign of antipyrin, and Fehling's solution is reduced and chloroform is produced when treated with a solution of caustic potash and heated, the latter tests being characteristic of chloral.

Bichloralantipyrin is formed by taking concentrated solutions of antipyrin, and so mixing them that the result shall contain two molecules of chloral to one of antipyrin, and an oily product likewise results, which again in time forms definite crystals in the form of prismatic needles, possessing the same reactions, however, as monochloralantipyrin.

If it be admitted that these two bodies are definite compounds, a fact which at first seems not entirely probable, for it can hardly be admitted that a compound body could give the distinct tests of its separate components it would be interesting to determine as to whether the action of the two compounds

are identical. We have already on previous occasions published the conclusions of several observers as to the action of this combination of chloral and antipyrin. The most recent contribution to the literature of this subject is an elaborate experimental essay published by Professor Sée in *La Médecine Moderne* for December 18, 1890. He has shown that both the monochloralantipyrin and the bichloralantipyrin possess a similar action to chloral, differing from the latter only in being less depressing in their action on the heart and blood-vessels. In the dose of 3 to 4 grains for every two pounds of body-weight, when injected into the veins, a hypnotic action is produced, while anæsthesia and abolition of reflexes only occur when the doses reach 4 and 5 grains. He has found that sleep always follows anæsthesia, and that the toxic dose is about the same for both products, being about 15 grains for every two pounds of body-weight, death in such cases being produced by arrest of the heart and respiration, respiratory arrest always preceding that of the heart.

When one compares the toxic doses above mentioned with the quantity of chloral contained in each of these two bodies, it would seem that the chloral contained in the monochloral compound is less toxic than that in the bichloral.

Dr. Sée further maintains that never, even in toxic doses, are convulsions produced by the monochloral or the bichloral of antipyrin, and that the action of the chloral thus masks that of antipyrin.

With small doses the respiration becomes slowed and becomes superficial, but if the injections are continued respiration becomes accelerated, abdominal in character, with prolongation of the expiration, breathing finally being arrested with the chest in expiration. So also after each injection the heart is somewhat slowed and intra-arterial pressure reduced. Then follows a phase of transient irregularity in the pulsations of the heart, which, however, disappear when sleep is induced. Should, however, the remedy be given in continuedly increasing doses, systole of the heart diminishes in amplitude, and the heart is finally arrested in diastole.

Dr. Sée has likewise investigated the therapeutic effects of these remedies, and finds that, like chloral, their use is not without danger in patients affected with heart disease; for in such cases they augment venous stasis, may produce dyspnœa, increase the quantity of albumen in the urine, and lead to various congestions. Especially in myocarditis they are particularly dangerous, since they depress the energy of the heart and destroy cardiac rhythm. Dr. Sée's results thus differ considerably from those of Dr. Bardet, who considers them as antispasmodics and hypnotics.

Dr. Sée terminates his article with the following conclusions:

1. Mono- and bichloralantipyrin, in doses of 45 grains, are hypnotic remedies, comparable to chloral.

2. They have no paralgesic action.

3. They should be prohibited in cardiac cases, above all when there is any disturbance in compensation.

4. They may, however, be administered with impunity as hypnotics in cases of aortic disease, if compensation is perfect.

5. They have no action in dyspnœa, whether of cardiac or pulmonary origin.

6. In some cases they seem to slightly augment diuresis.

7. They are almost as irritating to the digestive tube as chloral.

8. Compared to sulphonal and the other hypnotics of the chloral series (such as chloralamide and chloralimide), mono- and bichloralantipyrin are much inferior, on account of their depressing action on the blood-vessels and heart, even although that depression be less than that which follows the use of chloral.

Dr. Sée's conclusions thus are in accord with the observations of Dr. Quinquand (THERAPEUTIC GAZETTE, September 15, 1890, p. 648), and seem to show that this compound of chloral and antipyrin is not as inert as is maintained by Reuter (GAZETTE, March 15, 1890).

KOCH'S REMEDY FOR TUBERCULOSIS.

WE print on another page of this issue a statement which Koch has at last published as to the composition of his remedy, and it seems perfectly incomprehensible that it should have been at any time thought advisable to shroud his methods with the veil of secrecy. His explanation also of his method of procedure does not to our mind seem a perfectly candid one, but rather that, some sort of a statement being forced from him by the criticisms to which he has been subjected, he has told us as little as possible. All that he tells us now is that he has suc-

ceeded in extracting the active principle from the tubercle bacilli by means of a forty to fifty per cent. solution of glycerin. We fancy that even the most expert chemist or bacteriologist would find great difficulty in preparing a satisfactory "lymph" even from the most careful study of Koch's account.

Nevertheless, ever since Koch's first statement, journals in every tongue have been perfectly deluged with reports of cases of tuberculosis treated by this remedy, the majority of them claiming "satisfactory improvement." It certainly seems that the remedy has now been long enough before the profession to warrant some conclusion as to its value, but such a conclusion as yet does not seem possible. The enthusiasm which has attended its introduction is unparalleled in the history of medicine, and yet the results on calm investigation are surprisingly meagre. Moreover, it would seem that, instead of acting as a specific cure, the remedy may even do harm, and we would call attention to the article which we likewise print on another page as to the action of this remedy on internal organs of tuberculous patients. It seems, from Professor Virchow's remarks, that even Koch's immediate disciples have been unable to determine what cases would be likely to receive benefit from the injection, and that we cannot by any means depend upon the disintegration of even small tuberculous nodules after its influence. Further, without doubt, as is shown by a number of reports, the fatal issue has undeniably been accelerated through the use of this method of treatment, and some of Virchow's cases show that while the bacilli are not killed through this remedy, thus substantiating Koch's statement, they are not only not localized in a large number of cases, but that there is under the influence of this remedy an actual increase in the tendency to the formation of metastatic nodules or areas, even at considerable distance from the original tuberculous focus. There can be, however, no doubt of the extreme activity of the remedy as prepared by Koch; and, in fact, this activity, until we learn to control it, is an additional source of danger; and cases are on record where at the outset simple apical phthisis has become complicated with rapid infiltration of the lower lobes as a result of rapid and extensive sloughing, and soon proved fatal. We cannot be too earnest in calling a halt in the indiscriminate use of this remedy, which may perhaps do good, but which undeniably may do evil.

A SO-CALLED EUCALYPTUS HONEY.

IN the THERAPEUTIC GAZETTE for June 15, 1887, we made allusion to the so-called eucalyptus honey, and at that time expressed considerable scepticism as to the existence of such a substance. It seems now that our lack of faith is warranted, for in the *Pharmaceutical Journal and Transactions* of December 13, 1890, Dr. T. P. Anderson Stuart publishes a complete account of this, which he terms "the latest Australian fraud," where he presents plenty of evidence to show that this mysterious product is a mixture of leaf eucalyptus oil with ordinary honey.

Reports on Therapeutic Progress.

THERAPEUTIC PRINCIPLES GOVERNING THE SELECTION OF CARDIAC MEDICAMENTS.

We feel that no apology is necessary in publishing a full abstract of the two admirable lectures printed by DR. S. SOLIS COHEN in the *New York Medical Journal* for November 29 and December 6, 1890. These lectures are typical examples of the value of scientific investigation to practical therapeutics, and they bear upon subjects whose importance cannot be overestimated, and yet subjects concerning which there is too little exact knowledge obtainable. At the outset Dr. Cohen calls attention particularly to the fact that in all nature the period of repose is the period of repair; the period of activity is the period of waste. Rest means construction, upbuilding, a coming together of matter, with storing up of energy. Action means destruction, down-throwing, a tearing apart of matter with liberation of energy.

Throughout nature we have that continual rhythmic alternation of attraction, repulsion; construction, destruction; upbuilding, down-throwing; which, in the study of life-processes we call the *metabolic rhythm*, applying to its two phases the Greek terms, *anabolism* and *catabolism*.

Upon the preservation of this rhythm—that is to say, upon the maintenance of the normal relations between anabolism and catabolism, rest and action, repair and waste—depends the *structural and functional integrity* which constitutes the health of the various tissues of the body, and of the great aggregations of tissues we term organs or viscera.

Upon the preservation of this rhythm—that is to say, upon the maintenance of the normal relations among the activities of the various organs—depends the proper balance of function, the *intrinsic organic harmony*, which constitutes the health of the organism as a whole; in the case of man, the health of body and mind.

Upon the preservation of this rhythm—that is to say, upon the maintenance of the normal relations between the organism and its environments—finally depends the continuance of life.

Rest is valuable in therapeutics, because it conserves energy, saving to the organism as a whole, or to a particular organ or system of organs, the force that might be dissipated in action; because it lessens waste and gives opportunity for the repair of impaired tissues; because it tends to permit restoration of the disturbed rhythm of internal functions; because it places the organism in a favorable relation with its environment.

Nowhere is this more manifest than in the therapeutic relations of the heart and circulatory system. In the heart itself we have visibly and palpably illustrated the necessary alternation of repose and action.

Now, while the living heart is never at rest, absolutely speaking, yet its two opposite motions may, in relation with one another, be considered periods, respectively, of repose and action, of anabolism and catabolism. The diastole, mainly a passive state, is a period of repair in relation with the systole, which, as an active exertion of energy, is a period of breaking down of tissue. In clinical studies, as a rule, we speak of diastole and systole, simply meaning thereby the diastole and systole of the ventricles. But in studies like the present we must bear in mind that there is another diastole and another systole,—namely, those of the auricles,—and that the ventricular and auricular motions are not supplementary, but complementary. Except for the diastolic overlapping in the so-called period of pause, auricular diastole is synchronous not with the diastole, but with the systole of the ventricles, while auricular systole coincides in time with the diastole of the ventricles. When the blood is leaving the ventricles to enter the arteries, it is at the other end of the circuit entering the auricles from the veins. When it leaves the auricles it passes directly from them into the ventricles.

During diastole of the auricles, then, the heart receives into these chambers on the right side from the systemic circulation through the venæ cavæ, and on the left side from the pulmonic circulation through the pulmonary veins, the blood, which, during systole of the auricles and coincident diastole of the ventricles, passes into the latter, and by their systole is sent out from the right ventricle through the pulmonary artery into the pulmonic circulation, and from the left ventricle through the aorta into the systemic circulation. Following this is a so-called period of pause, both auricles and ventricles being relaxed. Auricular systole then follows as before. Reflux of blood from ventricles to auricles or from arteries to ventricles is prevented by valves. For proper circulation, both auricular and ventricular diastoles and systoles must preserve normal relations with each other, with the pulmonic and general blood-pressure, and with the respiratory rhythm; while for proper maintenance of health, both pulmonic and systemic circulations must preserve normal relations with each other and with organic functions generally. These relations comprise, structurally, on the side of the heart, integrity of the muscle, of its membranous cover and lining, and of the valves, and the equal capacity of the four chambers. On the side of the vessels structural integrity relates to the various components of the vessel walls (fibrous, muscular, and elastic tissues), and to the endothelial lining membranes (intrinsic integrity), as well as to the absence of any cause of obstruction by pressure or otherwise due to causes external to the vessels (extrinsic integrity). Functionally, the normal relations comprise the vigor, extent, duration, and orderly succession of the various phases of the cardiac movements, the free play of the valves, the synchronous action of right and left sides. As to the vessels, normal arterial tension is the most potent factor, while proper constitution of the blood itself is a most material circumstance. While relations remain normal, the therapeutist has no function to discharge. When from any cause normal relations become disturbed, the problem presented to the therapeutist is, first, how to avert the immediate dangers arising from such disturbance; and, secondly, how to remedy the disturbance. Both phases of the problem may coincide, and the same measure solve both; or temporary measures may have to be instituted to meet an emergency, which may afterwards be withdrawn or modified as the main difficulty comes under control. In combating the main difficulty,

our measures may be radical,—that is to say, they may aim to *remove the cause* of the trouble; or, should this be impracticable, they may aim, notwithstanding persistence of the cause, to *restore equilibrium* by artificial means.

Restoration of equilibrium—that is, of the normal balance of function which constitutes health—may be accomplished *directly or indirectly.*

Direct restoration of equilibrium implies exaltation of a depressed function or depression of an unduly exalted function to the normal level. An example of such direct restoration, as accomplished by nature is given by the illustration of spontaneous healing, the compensatory hypertrophy of the heart which frequently takes place in cases of insufficiency of the mitral valve. Here the enlargement of the ventricle and the increased force of the systole compensate for the leakage of blood which takes place through the damaged valve, and the balance of function is preserved. We imitate this natural compensation when we administer digitalis to increase the vigor of the cardiac contractions.

Indirect restoration of equilibrium implies either depression of normal functions to the level of an impaired function with which they may be correlated, or, on the other hand, elevation of normal functions to the level of an unduly exalted function with which they may be correlated. An example of such indirect restoration of equilibrium, at least temporarily, by nature, is the arrest of hemorrhage by syncope, where the action of the heart is depressed to the level of the impaired resisting power of the injured vessels. This is therapeutically imitated at times by the administration of aconite or the application of ice over the præcordium in cases of hæmoptysis; or, as is sometimes done by military surgeons in cases of wound through the lungs on the battle-field, by the letting of blood from an arm.

Nowhere is the therapeutic problem more complicated by the complicated relations of various functions than in the case of morbid derangements of the circulatory system, and nowhere are the results of intelligent study of the problem leading to a proper adaptation of means to end more brilliant.

In all our considerations of the actions of drugs upon the heart and vessels we must bear in mind the terminal circulation. We must remember the interchange of gases, of oxygen, and carbonic acid, not only in the lungs, but also in the intercellular lymph-spaces,—the *internal respiration;* and the allied processes of final assimilation and initial excretion,—that is, the bringing of the materials of cellular anabolism and the taking away of the products of cellular catabolism,—of which it may stand as type. We must consider, then, not alone the state and action of the heart, but also of the vessels. We must consider the distribution of the blood, peripherally, ventrally, in the various organs; the relative quantities of blood in the venous and arterial systems; as well as the relation which the whole amount of blood bears to the propulsive power of the heart. We must consider the conditions which favor and oppose circulation not only in the heart itself, the main trunks, and the larger vessels, but also in the capillaries, in the lymph-spaces, in the venous radicles. We must consider the conditions which favor and oppose the internal respiration, and also the pulmonary respiration. We must inquire into the conditions affecting the pulmonary circulation. We must examine the condition of the great abdominal vessels,—the portal circle; and estimate the effect of our therapeutic measures upon the organs of elimination, especially the skin and the kidneys, which are so powerfully influenced by changes in blood-pressure and in the tension of the vessel-walls. Other considerations, also, come into view, which, however, can be more appropriately discussed in their special relations. But, above all, we must remember that our prime object is to *restore equilibrium, to re-establish the balance of function,* for that constitutes health. And, in order that we may be able to choose proper measures by which to re-establish equilibrium, we must inform ourselves as to all the disturbing factors. Thus it is that, while so-called "polypharmacy"—the objectless throwing together of a number of drugs in one prescription—is to be unhesitatingly condemned, yet in the application of remedies to the treatment of diseases affecting the heart and circulation it is often necessary to intelligently combine agents some of whose actions are in opposition. Digitalis, for example, may in some cases of cardiac dilatation, while acting beneficially upon the heart, yet, through its action upon the vessels in unduly heightening arterial tension, tend to again disturb the equilibrium which its cardiac action tends to restore. In such cases, as has been more especially shown by Bartholow, we can, by the simultaneous administration of nitroglycerin, which relaxes the terminal vessels, modify the digitalis effect;

and the therapeutic object—*restoration of the balance of function*—is successfully accomplished. We must now try to gain some further insight into the important relations between those two great factors in the circulation which the example just cited shows us in apparent opposition,—the systolic impulse and the arterial tension.

The force by which the blood-current overcomes resistance is called the blood-pressure. The great cause of blood-pressure is the systolic contraction. Pressure is greatest in the ventricles during their systole, and least in the auricles during their diastole. Therefore these states, as we have seen, being coincident in time, the blood moves *from* the ventricles (in systole) and *towards* the auricles (then in diastole), traversing meanwhile the systemic and pulmonic vessels. These vessels afford the only route of communication between the left ventricle and the right ventricle on the one hand (systemic circulation), and between the right ventricle and the left auricle on the other hand (pulmonic circulation). There must be a gradual and continuous fall of pressure along these routes from terminal to terminal, in order to permit the movement of the blood, which takes place in the direction of least resistance. As pressure acts equally in all directions, the blood-pressure opposes the action of the heart in systole, and favors the action of the heart in diastole; in other words, there is, in consequence of the blood-pressure in the arterial system, a constant tendency towards reflux to the heart, which is normally prevented during systole by the higher pressure in the heart, and during diastole, so far as the ventricles are concerned, by the closure of the pulmonary and aortic valves. Thus the blood-pressure at any point represents the *possibilities of circulation* at that point. It should be higher than at the point beyond, and lower than at the point preceding. Whenever these conditions are reversed there is obstruction to circulation.

In applying these physical considerations, the author takes as the simplest example at command a case of simple dilatation of the heart without valvular lesion. With the symptoms of this condition all are familiar. In the natural order of studies they come first. It was the palpitation, dyspnœa, coldness of extremities, tendency to vertigo and syncope, incapability for exertion, weak, rapid, irregular, perhaps intermittent pulse, œdema more or less marked, that, together with the physical signs obtained upon auscultation and percussion, led to the diagnosis. Embarrassment of circulation due to an incompetent heart was the clinical diagnosis. Dilatation without valvular lesion was the pathological diagnosis. Simple dilatation, it is true, is very rarely, indeed some say never, encountered at autopsies. Still it is a condition precedent to some of the lesions ordinarily found post mortem; it is clinically recognizable, and it affords the best foundation for our studies. The cause of the morbid condition in this case is in the background. It may have passed away, but it has produced its effect, and that effect is, in the strict use of words, incurable. We cannot by therapeutic measures restore the heart to its normal size. The indications, then, are to prolong life and promote comfort.

The "*what* to do" is to place this patient's permanently damaged heart in such relations with his other organs, and the patient himself in such relations with his environments, that life may go on as long as possible and with as little distress as possible.

The "*how* to do it" is the next point to be determined. Evidently there are two complementary indications. The one is to reduce as much as possible the work placed upon the heart,—*indirect restoration of equilibrium*. The other—*direct restoration of equilibrium*—is to strengthen the heart as much as possible, and to so regulate its action as to get the best possible results from what strength it possesses; in other words, the maximum of product with the least expenditure of energy.

Then the "*where*" naturally follows; first, we apply our remedial measures to the organism as a whole; and, secondly, to the heart.

The first thing to be done is to place the patient in as favorable a condition as possible in relation with his environment. We must reduce the activities of the body at large to the level of the impaired power of the heart, and therefore the patient must not be allowed to pursue a laborious occupation, or one which may make sudden demands for extraordinary exertion, either mental or physical. He must be protected from shocks and emotional disturbances of all kinds.

According to the degree of dilatation, the patient's social status and previous habits of life, and the extent to which untoward symptoms have developed, the physician's advice as to occupation, rest, and exercise will vary. Absolute rest may be necessary for a while if there be acute or severe symptoms of em-

barrassment of circulation or respiration, or if there be much dropsy. On the other hand, a certain amount of exercise—active or passive, or both—is necessary, whenever no counterindication exists. It is necessary in order that terminal circulation and internal respiration shall be kept up, in order that the products of waste shall be removed. It must be gentle and intermittent; never allowed to become fatiguing. Walking is the best form of active exercise, and this may be supplemented by such passive exercise as the simpler and gentler forms of massage,—friction and stroking. A wealthy patient may be told to take short walks while his carriage follows him, with instructions to enter the carriage as soon as he has gone the prescribed distance, or sooner, should he feel the slightest indication or premonition of fatigue. In the city, patients who do not have carriages should walk on a street in which there is a car-track, and in the opposite direction to the cars, so that they may ride home, and be able to do this at any moment. Where this is impracticable, the walk must be so divided that going and returning shall not be too much. In all cases the distance must be prescribed and not left to whim; at first very little,—half a block, in the city,—and gradually increased to whatever maximum may be judged to be proper. This maximum must always be a little short of what is deemed to be the limit of the patient's ability. It is always well if a walk can be broken by intervals of sitting. We can for this purpose let patients ride to a park or square, if in the city, so that in the square they may alternately walk for little whiles, and rest for little whiles on the benches. Massage should be employed as an adjuvant when walking is possible, and as a substitute for active exercise when the latter is impossible. It should not be practised more than fifteen or twenty minutes at a time, except in special cases. It must be gently and skilfully done, the patient being in the recumbent posture. The lower extremities especially should be manipulated. As far as is wise in any individual case, the effort should be made to act upon the veins directly, so as to impel the blood centripetally, yet not in too great a volume for the heart to deal with. The principles set forth in our study of massage must be kept in mind. Should dropsy be present, the time and manner of manipulation would be governed accordingly. Electric applications are of service in some cases of dropsy, but the consideration of this measure must be postponed until we have studied the action of the electric current more in detail.

In some cases the patient will be able and may be permitted to engage in some light occupation which itself allows opportunities for moderate exercise, alternating with rest. In these cases no special walks will have to be advised and massage may not be needed. It is necessary to secure for all patients, however, a certain amount of time in the open air every fair day, during which they may sit, ride, or walk, according to circumstances. Where a sufficiency of outing cannot be obtained, inhalations of oxygen or of compressed air may be administered. Compressed air is also of advantage in equalizing the circulation by its mechanical pressure-effects.

The first effect of impaired cardiac power is deficient circulation. As we have lowered the general muscular and mental activities—that is, exertions in relation with external environment—to the level of this impaired circulation, so must we lower what may be called the internal exertions to the same level.

Beginning our consideration of these with the digestive system, it is obvious that we must reduce the amount of work placed upon it, while at the same time the impoverished condition of the heart-muscle calls for the best possible nutrition. And not only must we endeavor to nourish the heart itself, but we must remember that, as a further consequence of impaired circulation all the organs and tissues have suffered in two ways,—from lack of proper material for anabolism, and from defective removal of the products of catabolism. The blood is, to a greater or less degree, stagnating in the veins. It cannot get back to the lungs to be purified. So that the comparatively empty arteries bring little new material for upbuilding; the overfilled veins retain the poisonous products of the breaking down of tissue. Therefore, while diminishing the quantity of food ingested, in order thus to diminish the work of the digestive organs, we must highly increase the nutritive value of the food as well as its force-producing value, and, as far as possible, diminish the amount of waste that will be left to deal with. Such foods, then, are to be chosen as, in the study of the subject of food, are found to fulfil the indications mentioned,—milk, oils and fats, especially butter, a moderate amount of properly prepared meat, eggs, fish, rice, grapes, and certain other fruits containing sugar, malt preparations, al-

cohol (malt liquors, sweet wines, and spirits) in moderation, and the green vegetables. Potatoes and other bulky foods are to be interdicted, as are all sorts of indigestible cookery. Predigested foods, especially preparations of peptonized beef, and such combinations of peptone and maltose as the "peptonized milk-gruel," are of great service. The digestive ferments are sometimes serviceable, as is also the administration of dilute acids, during or immediately after meals. According to circumstances, food may be taken frequently in small quantities, or in the ordinary manner of three stated meals. As a rule, a glass of hot milk or milk-punch should be taken at bedtime.

Respiration, being the "second digestion," must be properly performed. We have already spoken of exercise and of inhalations of compressed air and of oxygen. Solution of hydrogen dioxide in water or in ether (ozonic ether) may be given to supplement respiration by utilizing the stomach for the direct introduction of oxygen into the blood. The so-called "fifteen-volume" aqueous solution, properly diluted, may be given in doses of from 1 to 4 fluidrachms. The ozonic ether may be given in doses of 1 fluidrachm, with an equal quantity of glycerin, in enough water to make a tablespoonful. These agents also tend to slow and strengthen the heart. The cardiac medicaments, to be considered later, likewise favorably influence the respiration.

Extraordinary attention must be paid to the excretions, not only for the reasons already and sufficiently dwelt upon, but also to prevent dropsy from accumulation of fluids in the ill-nourished veins,—a combination of circumstances under which transudation is most likely to occur. Fortunately, among the medicaments most appropriate to the cardiac conditions are several of the best diuretics and diaphoretics. In addition to these, agents acting upon the liver and the intestines must be employed, continuously or from time to time, as indicated.

Three indications are to be fulfilled by cholagogue and purgative medication. First, we avoid increased obstruction to the great portal circulation, already sufficiently embarrassed. Secondly, we can, by the use of suitable agents, remove from the circulation, by way of the intestinal vessels, a large amount of fluid, thus diminishing the volume of blood to meet the impaired propulsive power of the heart, and increasing the comparative richness of the blood in corpuscular elements. In cases of dropsy, we actively resort to this method in order to secure reabsorption of the transuded fluid to take the place of that removed by way of the bowel; but it is better to prevent dropsy by continuous mild purgation. The third indication is that of removing waste products, the importance of which by this time we fully understand. Sodium phosphate, euonymin, and similar resins, rhubarb, Epsom salts, Rochelle salts, various mineral waters, calomel, and jalap are among the most useful agents, the choice depending upon principles already laid down in discussing cholagogue and purgative medication. Calomel and Rochelle salts have the additional usefulness of a certain amount of diuretic power. It is especially in cases of cardiac impairment that the diuretic properties of calomel are most available.

Remedies to improve the condition of the blood itself are also to be administered. Of these, iron stands first; next to it is arsenic. Chloride of gold and sodium, bichloride of mercury, and chloride of calcium may sometimes be useful for short periods in alternation with iron or arsenic. Cod-liver oil stands prominently forth as a hydrocarbonaceous food and a blood-former of great utility. Phosphorus and its preparations, more especially the hypophosphites, may in some cases be advantageously combined with the cod-liver oil. Given alone, they are of little use in the class of cases under consideration.

And now, having placed our patient in harmony with his enviroment; having lowered his digestive work to the capacity of his circulation, and improved both the digestive product and the blood itself in accordance with the needs of the impoverished tissues; having done what we could to improve respiration so far as it can be improved independently of circulation; and having duly attended to the excretions,—we can devote our attention to the organ which is itself at fault.

The first lesson to be drawn from the considerations thus far passed in review is this: That the diseased organ is not the only organ to be treated, and not always the first; and that direct treatment is not always the first or the best. It is very probable that the measures already adopted will so far have improved the heart by their indirect influence as to considerably modify the indications for direct cardiac remedies.

While this is the preferable method of procedure, yet there is another side to the question. It may be that, on account of the

patient's necessities or the demands of his business, our advice as to rest and regulated exercise cannot be carried out. Remember, this is the best advice. It is our duty to place before the patient the danger of neglecting it. Still it may be impossible to follow it. Then we must modify it to the exigencies of the occasion, and the choice of a remedy to act directly upon the heart will come up at once.

In the case supposed of simple dilatation without valvular lesion, the indication is "to empty the veins and fill the arteries;" and the best agent at our command is digitalis. The best preparation of this drug to use in the case supposed is the powder of the leaves, which may be made into pill and given in the dose of ¼ to 1 grain or more, three times a day. The tincture may be employed in doses of from 2 to 5 drops or more, three times a day. Where a diuretic effect is specially desired the infusion is sometimes to be preferred, in doses of ½ fluidounce, night and morning.

By prolonging the diastole, digitalis increases the period of comparative rest; of anabolism. It gives opportunity for increased nourishment of the muscular tissue. It gives opportunity for an increased accumulation of energy to be later discharged in the systole. And by increasing the force of the systole it compensates for a certain part of the lost original vigor of the heart. By slowing the circulation, it diminishes the relative expenditure of energy in a given time. By its action upon the kidney, it increases the excretion of urine,—both the watery and the solid constituents.

It may, however, have one untoward effect. It heightens blood-pressure by causing contraction of the arterioles, and thus to a certain extent opposes the cardiac contraction. Should this action be too pronounced, we can overcome it by the simultaneous administration of nitroglycerin, or other nitrite. The nitrites, by dilating the vessels, and especially the peripheral vessels, invite the blood into the capillary circulation, and take off from the heart a great portion of its labor. As a matter of course, they must be cautiously employed, the smallest dose ($\frac{1}{100}$ minim or less of nitroglycerin, three times a day) being given at first, and the quantity gradually increased until the desired effect is produced. In some cases nitroglycerin or nitrite of sodium may be given alone. The labor of the heart being thus diminished and its tone having been improved by nutritive measures, the administration of digitalis will not be necessary. This expedient is particularly useful in the treatment of fatty heart, in which digitalis, as we have previously seen, is, as a rule, counter-indicated. In these cases arsenic and strychnine are extremely useful agents.

But to return to digitalis, we must remember that no sudden change of posture is to be permitted during its administration. Especially dangerous is the change from recumbency to the erect posture. We must also avoid the risk of producing a cumulative effect, and the best, as it is the most obvious, method to avoid this danger is the routine intermission of the use of the drug at intervals to be determined by all the circumstances of the individual case.

But what are we to substitute for digitalis during these periods of intermission, or in those cases in which it is not well borne, though apparently indicated? Of single agents, strophanthus is to be preferred. Convallaria and adonis vernalis, or their active principles, and sparteine, a principle derived from scoparius, are also useful, and by some authors preferred. Better sometimes than any single agent is the combination of caffeine or cocaine with strychnine. Before discussing the other agents, then, let us briefly recall our knowledge of the action of caffeine and that of strychnine, and see why it is that this combination is of such great utility. Strychnine, in the first place, is a general tonic, improving digestion and increasing the capacity of the individual for physical and mental exertion. In addition to this, it has distinct usefulness as an agent acting upon circulation and respiration. It affects the centres of organic life, heightening their impressionability and increasing the energy of their discharge. It thus acts by central influence as a stimulant to the heart and to the respiratory muscles. But it also acts peripherally upon the motor ganglia of the heart, directly stimulating and heightening the energy of their discharge. It also acts upon the muscular tissue itself, increasing the vigor of contraction, a fact of which we have abundant clinical evidence as to man, whatever may be the laboratory evidence as to animals. It is thus a catabolic agent; but the catabolism which it produces is an effective catabolism, giving the highest force-product with the least degree of waste. It has some tendency to heighten peripheral blood-pressure by contracting the vessels, but this is not always marked.

Caffeine, or perhaps we ought to say the article of commerce sold under the name of caffeine, but which, as Mays has shown, is in reality a mixture of caffeine and theine,—so-called caffeine, then, acts to some extent upon the nervous supply of the heart, but its chief action is upon the heart-muscle. It increases very greatly the vigor of the systolic contractions and diminishes their frequency. It improves respiration both by directly strengthening the respiratory muscles, and indirectly by its action upon the circulation. It is a diuretic of no mean power. Like digitalis, caffeine raises the arterial tension, but in the case of caffeine this effect is not so likely to be excessive as it is in the case of digitalis; so that the conjoint use of the nitrites is not often necessary. A moderate elevation of arterial tension, if well distributed, is beneficial, as it secures a better distribution of the blood. In order to get the full benefit from caffeine, it must be used in fairly large doses,—5 grains three times a day, for example. With this, from $\frac{1}{60}$ to $\frac{1}{30}$ grain of a strychnine salt may be combined. Where in an individual case, for any reason, a more rapid effect is desired than caffeine usually gives, we may have recourse to cocaine, which may be given *per os* in doses of from $\frac{1}{8}$ to $\frac{1}{2}$ grain, or hypodermically in doses not exceeding $\frac{1}{4}$ grain. For prolonged administration, however, caffeine is to be preferred. Where neither caffeine nor its combination with strychnine seems to be sufficiently stimulating,—that is to say, where, despite the increased vigor of the cardiac contraction, it seems not to be sufficiently free,—a minute dose of cocaine—say $\frac{1}{15}$ grain—may be advantageously combined with the other agents for continuous use for short periods, say a week or two at a time. In some cases, instead of adding cocaine to the pill, a good wine of coca may be given as a beverage in appropriate doses. The patient should also be advised, even while taking digitalis, to drink a cup of strong coffee at each meal and before going to bed. In a few cases of moderate impairment of cardiac vigor, the drinking of strong coffee has sufficed to keep the patient comfortable, without resort to digitalis or other drugs.

Now, a few words as to *strophanthus*, which, as already said, the author esteems more highly than any other agent yet brought forward to replace or supersede digitalis. This drug is not yet officinal, and it is difficult to get a reliable preparation. The tincture prepared according to the directions of Fraser, of Edinburgh, is the best. It may be given in doses of from 1 minim to 10, or in some cases, with due caution, even 20 minims, three times a day; or a large dose may be given at first and the impression maintained by small doses at shorter intervals. The duration of its effect gives to it much of its great usefulness. Its effects are similar to those of digitalis, in that it slows the rate of the heart, lengthens the interval between the contractions, and increases the vigor of the muscular action. This is thought to be due to direct action on the muscle substance, and not to any effect upon the nervous system. By its action on the heart it raises blood-pressure, producing diuresis. It does not, however, markedly contract the arterioles as does digitalis, and therefore compensatory use of the nitrites is not necessary. It does not disturb the digestive tract. A patient, for example, in whom cardiac weakness is part of a general muscular and nervous degeneration, takes tincture of strophanthus and tincture of digitalis alternately and coincidently in the following manner: Having taken thrice daily for a week 10 drops of the tincture of digitalis, he begins to diminish the quantity, substituting in each dose the first day a drop of the tincture of strophanthus for a drop of the tincture of digitalis. The second day two drops, the third day three drops are substituted; and thus during ten days the digitalis is diminished and the strophanthus increased *pari passu*, until finally the patient is taking ten drops of tincture of strophanthus and no digitalis. After a week of strophanthus he begins to substitute for it the digitalis, a drop at a time, reversing the previous process. This expedient has been found preferable to either the uninterrupted continuance of either drug or an abrupt change from one to the other.

Strophantin, a glucoside derived from strophanthus, is given in doses of from $\frac{1}{120}$ to $\frac{1}{30}$ grain hypodermically, repeated at long intervals, perhaps of many days, as the effect is said to be quite prolonged.

Convallaria and its glucoside, *convallamarin*, have received high encomiums from Sée and other authorities; but neither clinical experience nor laboratory studies warrant a decided expression of opinion in its favor. In some cases it is highly useful as a substitute for digitalis, but it frequently disappoints us. Its properties as a diuretic are more constant than its power over the heart.

Adonis vernalis and its glucoside, *adonidin*, have been found useful by so eminent a clini-

cian and careful observer as Da Costa. Dr. Cohen's experience with this drug is very limited, but is satisfactory as far as it has gone. It is similar in its action to digitalis both in its effects upon the heart and vessels and its diuretic properties, but is much more powerful, and its use is said not to be attended with risk of cumulative action. At present it is employed chiefly as an adjuvant to digitalis or a temporary substitute therefor, though it is said to succeed sometimes when digitalis fails. According to some authorities it is even more likely than is digitalis to produce symptoms of gastro-intestinal irritation (nausea, vomiting, and purgation). There is no officinal preparation of adonis. An infusion is made (one-half to two drachms of the root to six fluidounces of water), of which the dose is ½ fluidounce every two to four hours. Adonidin is given in doses of from ⅛ to ½ grain, repeated as necessary.

Sparteine, derived from broom, may be given (as *sparteine sulphate*) in doses of from $\frac{1}{16}$ to 3 or 4 grains, the ordinary range being from ½ to 2 grains. It has received high encomiums both from experimenters and clinicians, and is recommended in the warmest terms by so practical an observer as Bartholow. In some cases its most marked properties were a comparatively rapid action and a regulating power,—that is, a power to render steady and continuous the previously unsteady and intermittent heart-beats,—even superior to that of digitalis. In these cases the drug was given in small doses, repeated four or five times during the twenty-four hours. They were not, however, cases of simple dilatation such as we are now discussing, so that perhaps the conclusion is justifiable that the peculiar virtues of this drug are better applicable to the relief of those disordered conditions of innervation and muscular action which are manifest in the more advanced stages of valvular lesions. When effective, the action of the drug continues for twelve or twenty-four hours, and, according to some authorities, even longer. Sparteine has considerable diuretic power, though, as a diuretic simply, it is, in Dr. Cohen's experience, inferior to the infusion of broom. There is, however, this drawback to the use of bulky infusions in the treatment of cardiac disease,—that the quantity of fluid ingested is likely to be disadvantageous.

Erythrophleum is a drug which may eventually be found useful in the treatment of weak hearts; at present its use is almost exclusively confined to the laboratories.

Barium chloride has a limited degree of applicability, and Dr. Cohen has had a few satisfactory results from its employment, more especially in the treatment of the over-acting heart and relaxed vessels of exophthalmic goitre.

We are now perhaps in a better position to illustrate by a further refinement the extended application of our therapeutic triangle, *what*, *how*, and *where*. As we used it in solving the main problem of the line of treatment, so we can, indeed must, however unconsciously, use it in solving special problems as to details of treatment. In the selection of a drug to act upon the heart, we can choose one which affects principally the nerves, or one which affects principally the muscles, or one which acts upon both. Or, again, in its action upon the nerves, a drug may slow the heart by depressing the motor apparatus,—cerebral, peripheral, or communicating; or it may slow the heart by stimulating the inhibition apparatus,—central, peripheral, or communicating. That which makes digitalis preferable in most cases to all the other drugs mentioned is the fact that it acts both on nerves and on muscle, both on inhibitory and motor apparatus, and that the result of this combined action is to slow and strengthen the heart, by a stimulating effect throughout, without depression of any kind. For the same reason the combination of caffeine and strychnine is useful. It is true that in studying digitalis we classed it among the cardiac sedatives as well as among cardiac tonics. But its sedative power is the sedative power of strength; the irritation which it calms is either the irritation of weakness or the irritation of loss of control.

When sedation is required for a heart which is acting too rapidly or too powerfully, because it is too strong, digitalis is not an appropriate sedative.

In our study of aconite we recognized in it a depressant *ab initio*. Digitalis, if pushed too far, may paralyze by exhaustion. But aconite is a paralyzing agent from the first. It depresses nervous function without much interference with muscular power *per se*. While it is true that experiments on normal animals have not revealed any such property, its prolonged administration, in perfectly safe medicinal doses, seems, clinically, to cause a certain degree of retrograde metamorphosis in hypertrophied heart-muscles, probably by influence on trophic nerves, or, in other words, by interference with anabolism. Its peculiar field of usefulness is in cases where

we wish to reduce power, and hypertrophy without valvular lesion may serve as a type of these cases.

In a case of eccentric hypertrophy due, we will say, to excessive muscular exertion, the *what*, *how*, and *where* are self-evident.

We cannot materially alter the condition of the heart-muscle. We must avert evil consequences by regulation of the patient's life and by the use of agents to diminish the force of the heart's action. Now, regulation of the patient's life does not imply that we are to increase his exercise up to the level of his heart's overaction. If we could by so doing increase the size of all his organs, including the skeleton, proportionately,—in other words, if, having a gigantic heart to deal with, we could, by prescribing giant's work, transform the patient into a Goliath,—that would be the proper line of treatment; but this is manifestly impossible. Even the heart itself is not the subject of regular and proportionate enlargement; the left ventricle, in the case we are considering, being disproportionately increased both in capacity and in the thickness of its walls. We must, therefore, paradoxical as it seems, prescribe rest. It is not necessary in the ordinary case—that of the blacksmith, or that of athletes, a class of men who frequently suffer from a similar condition—to prescribe absolute rest in bed, except in the presence of urgent symptoms. We must, however, at once interdict the over-exertion which has brought about the morbid condition. Furthermore, while permitting sensible exercise, we must not allow it to be too prolonged; and all sudden or violent exertion must be absolutely prohibited. Alcohol, tobacco, immoderate eating, and mental excitement must be avoided. To prevent straining at stool, the diet must contain laxative elements, and an occasional mild purge be exhibited. All conditions which tend to disturb the circulation, particularly in the abdomen and in the lungs, must be guarded against.

The quantity of fluid taken into the stomach should be limited. In the presence of symptoms of cerebral hyperæmia a hydragogue cathartic may be used to unload the vessels. A blister may be applied to the nape of the neck and wet cupping of the chest, or even venesection, may be performed in urgent cases. As a rule, however, rest and the administration of aconite will avoid necessity for bleeding. The dose of the tincture of aconite-root will vary from 1 to 5 drops, which may be given three times a day or at intervals of two or three hours according to circumstances. Sometimes it is well to begin with larger doses, and as the influence of the drug becomes manifest to diminish the dose to as little as will keep up the effect. Very often 1 drop twice a day will be efficient. In some cases, however, comparatively large doses will need to be continued, or at all events to be resorted to, from time to time, for five or six days together. Diluted hydrocyanic acid in doses of from 2 to 5 drops, diluted hydrobromic acid in doses of from 10 to 30 minims, potassium bromide in doses of from 10 to 30 grains, potassium iodide or sodium iodide in doses of from 5 to 10 grains, may be used as adjuvants to the aconite, or in its place. Belladonna has been recommended, but it seems counterindicated, its action being both to increase the rapidity and the vigor of the heart's action and to raise the arterial tension, except when the opposite effect results from paralysis by exhaustion due to large doses.

There is, however, one condition of overaction of the heart in which belladonna is of considerable service,—namely, in the irritable, irregular, and feebly overacting heart of some cases of tobacco-poisoning. In this condition the combination of belladonna (which is in these cases preferable, by reason of its antispasmodic properties, to its alkaloid, atropine) with strychnine, digitalis, or caffeine has proved useful.

The difference between this condition and the condition of excessive strength we have been considering is at once rendered evident by the fact that digitalis has been enumerated as among the agents usefully combined with the atropine. Diluted hydrocyanic acid, cimicifuga, musk, the bromides, and especially monobromated camphor, often act beneficially in this disorder. Sodium iodide in small doses is also useful.

Having firmly fixed in our minds, then, the principles which should guide us, and the measures which may be most usefully applied in the treatment of dilatation with weakness, and hypertrophy with excessive power, apart from valvular lesion, and having briefly alluded to the pseudo-hypertrophy of irritation by tobacco, we have now to consider how our treatment is to be modified when either of these conditions coexists with a valvular lesion. We can do this more briefly on account of the wide range which our previous studies have taken. It will be self-evident that where hypertrophy coexists with a valvular lesion, being itself not alone

the physical result of that valvular lesion, but also nature's "spontaneous healing," in the sense in which we have agreed to use this term, it will be self-evident that where such hypertrophy is in degree merely enough to compensate for the damaged condition of the valve there is no occasion for therapeutic interference. Conversely, when a valvular lesion has been thus compensated by hypertrophy, the condition of the valve affords no indication for therapeutic interference. Should the hypertrophy be excessive,—that is, more than sufficient for compensation,—just in the degree that excess exists will such excess afford indication for treatment with aconite or a bromine salt, or both. In the majority of cases, however, even when the lesion—for example, mitral regurgitation—is compensated by ventricular hypertrophy, it is necessary to adopt, to some extent, the hygienic measures which we discussed at length in the case of simple dilatation, for the hypertrophy which balances mitral regurgitation is to be looked upon as potentially a condition of dilatation. It becomes actual dilatation when it no longer suffices to overcome the obstruction to circulation brought about by the regurgitation. This is called *rupture of compensation*, and the treatment then is almost exactly that of dilatation, both hygienically and medicinally. In other words, in cases of mitral regurgitation, the main indication for treatment is afforded not by the condition of the valve, but by the condition of the muscle relatively to the valve. Clinically, the rational symptoms—that is to say, the condition of the circulation and respiration, the presence or absence of dropsies—are the data upon which we base our opinion as to whether or not compensation exists.

Somewhat different indications are afforded by aortic stenosis, for here not alone the condition of the muscle, but that of the valve itself must be considered when the selection of medicaments become necessary,—that is to say, when compensation has been ruptured. For example, we can not resort to digitalis to strengthen the muscle, as we would in a case of mitral regurgitation with ruptured compensation, on the principle that the condition is practically a condition of excessive dilatation. Digitalis raises peripheral blood-pressure, and would thus co-operate with the obstruction at the aortic orifice in opposing exit of blood from the ventricle. By lengthening the diastole, it would permit a quantity of blood to enter the ventricle beyond the capacity of the ventricle to empty itself, thus increasing the embarrassment. If regurgitation coexists with the stenosis, as is usually the case, the lengthening of the diastole would also permit a greater reflux from the aorta into the ventricle. The net result, then, of the action of digitalis in aortic stenosis would be to overfill the ventricle, and any increase of power of contraction which it would give might tend to drive the blood backward through the mitral orifice rather than forward through the obstructed aortic orifice; for it would be quite possible for the gradual increase in the size of the heart, which has been brought about by the lesion, to have rendered even an intact mitral valve relatively incompetent and not able to withstand any great strain. Blood, like everything else, moves in the direction of least resistance.

If now we apply our therapeutic triangle, we see that *what* we want to do is to get the blood out of the ventricle as quickly as possible, and to have the ventricle again moderately refilled as quickly as possible. *How* to do this is to increase the rapidity of the contractions and to diminish the intervals between them. A moderate degree of increased vigor is, of course, necessary in order to overcome the obstruction; and, further, systemic blood-pressure should be lowered as far as is consistent with movement of the blood into the veins. These conditions are fulfilled by using a combination of atropine and strychnine, in conjunction with nitroglycerin or nitrite of amyl. The atropine, in addition to its power to hasten the rate and increase the vigor of the cardiac contractions, is, like strychnine, a stimulant to respiration also, while the nitroglycerin keeps the arterial tension within the required limits.

In cases of mitral stenosis,—that is to say, when the flow of blood from the left auricle into the left ventricle is impeded,—the indications are (1) to prolong the ventricular diastole so that as much blood as possible may get through the narrowed orifice; (2) to strengthen the heart-muscle so that the auricular contraction may be as effective as possible; and (3) when this lesion coexists, as it often does, with mitral regurgitation, to lower peripheral blood-pressure. The hygienic measures already discussed—iron and arsenic as nutritives, strychnine and caffeine as cardiac tonics—fulfil the two indications of uncomplicated stenosis, while digitalis and the nitrites are useful in cases complicated with regurgitation.

Aortic regurgitation remains to be considered, for uncomplicated tricuspid lesions and

lesions of the pulmonary valve are very rare.

There has been much difference of opinion as to whether or not digitalis should be used in cases of aortic regurgitation. As has been more especially pointed out by Bartholow, the rational symptoms rather than the pathological condition must be our guide. It will be easily seen that undue prolongation of the diastole will permit greater regurgitation, and that when compensation can be brought about without digitalis this drug had better be omitted. Nevertheless, the increased force which results from the digitalis action may be sufficient to more than balance the increased regurgitation which it permits, and in many cases it proves useful. It is, as will be readily evident upon reflection, most efficient in those cases of aortic regurgitation which coexist with mitral disease. Dr. Cohen's advice, then, would be, in any case of aortic regurgitation, to postpone the use of digitalis until other measures have proved inefficient. The most useful combination of medicaments is that of atropine, strychnine, and caffeine, with the occasional use of the nitrites. In all cases, of course, those measures of hygiene which bring the patient into harmony with his environment, and which aid in restoring the internal balance of function independently of the medicaments, are to be as carefully prescribed, as in the case in which we considered such measures at length.

There are other measures than those mentioned which might have been considered had time permitted. The effects of heat and cold, the use of opium as a sedative and as a heart-tonic in small doses, might have been enlarged upon. Camphor, and especially the monobromated camphor, musk, ergot, cimicifuga, veratrum viride, and other drugs which have a certain usefulness in special conditions, deserve more than mere mention. But we have had to choose the best and the most generally applicable measures ; and then, too, we have alluded to the virtues of these agents in our previous studies.

In conclusion, then, the first problem which presents itself in the treatment of chronic diseases of the heart is to determine whether or not nature herself has brought about restoration of equilibrium. Where this is the case, the function of the therapeutist is so to guide the life of his patient as to postpone to the furthest time possible the rupture of compensation. When compensation has been ruptured, or in cases where it has never been established, the first duty of the physician—unless urgent symptoms, such as ascites or thoracic effusions, call for immediate measures to meet the emergency—is to institute those hygienic measures which shall restore extrinsic and intrinsic harmony. After this, if medicaments are necessary, their selection should be based upon a careful study of all the conditions of the individual case, taking due account of the mental and physical characteristics of the patient.

HYPNOTIC ACTION OF ATROPINE AND DUBOISINE.

Dr. Nikolaus Ostermayer, of Buda Pesth, draws the following conclusions from a number of experiments made on the action of atropine and duboisine. (*Internationale Klinische Rundschau*, November 9, 1890.)

1. Atropine in doses of $\frac{1}{64}$ to $\frac{1}{32}$ of a grain is an undoubted sedative in maniacal cases, and is indirectly a hypnotic in so far as the reduced reflex irritability which follows its administration tends to favor sleep.

2. It is not to be compared with the safe and prompt action of hyocine in this respect, although the amount of depression which follows its use in medium doses is much less likewise than that which is caused by hyocine.

3. From repeated employment the organism becomes habituated to its use and the effects become accordingly less, or even may be entirely absent.

4. Unfavorable complications, with the exception of vomiting and diarrhœa in one case, are never observed.

5. Atropine frequently has in the author's hands succeeded in producing a sedative effect where hyocine and morphine had proved entirely inert.

From the above it would appear that atropine in certain cases may perhaps possess some sedative properties, yet there is so much to be said on the opposite side of the question that it is doubtful whether its use will ever become general. As regards duboisine, the author concludes that, in excitable conditions and various mental affections, duboisine is comparable to hyocine, and is free from any of the objections which may be urged against the use of the latter.

1. The sedative action of duboisine may be observed within ten or fifteen minutes after the injection.

2. Duboisine's prominent action is a sedative one, and sleep ordinarily follows within twenty to thirty minutes after its administration.

3. In states of extreme excitement $\frac{1}{32}$ grain to $\frac{1}{24}$ grain are required in simple insomnia, and $\frac{1}{84}$ or $\frac{1}{40}$ grain will usually suffice.

4. Symptoms of poisoning or unfavorable after-effects were never noticed.

5. The action of this remedy becomes weaker under prolonged use. The remedy was used by the author in 1 per mille solution.

The author likewise claims that the system becomes habituated to the use of hyocine as is the case with atropine and duboisine. In fact, he seems to regard duboisine as quite as useful a remedy as hyocine, as regards its activity, and preferable to it on account of its greater cheapness.

THE ACTION OF SOMNAL.

From five experiments made in the Loomis Laboratory, New York, by DR. W. GILMAN THOMPSON (*New York Medical Journal*, November 29, 1890), it appears that:

1. The ordinary dose of somnal (30 minims for man) may be given by hypodermic injection to dogs without other effect than drowsiness and slight vertigo and muscular tremor.

2. A dose of 1½ fluidrachms failed to affect a cat, except in the same manner as the dogs.

3. A fatal dose of ½ fluidounce stopped the respiration before the heart, and caused congestion of all the abdominal viscera.

4. The blood-pressure in the arteries of a dog is temporarily increased by somnal, soon returning to the normal.

Dr. Thompson further states that in the past few months he has given somnal on fifty-four different occasions, in doses varying from 30 minims to a drachm, in forty different patients, care being taken to select only those patients who presented well-marked cases of insomnia. The cases were selected also with a view of having as great a variety as possible in the causes of the insomnia. The list includes, therefore, insomnia due to rheumatism, phthisis, bronchitis (cough), typhoid delirium, delirium tremens, sciatica, various forms of pelvic pain, neuralgias, etc.

Of the fifty-four instances in which somnal was given, it produced sleep twenty-six times within fifteen minutes and forty-three times within an hour. In six cases only it is noted as having no effect at all. In a few other instances where it failed to induce sleep it was found to have a very soothing and quieting effect. Sixteen patients slept practically all night after taking ½ drachm. Fifteen more slept between three and six hours, and the remainder for briefer intervals.

In most of the patients the character of the sleep was natural; in only one or two cases did it seem more profound than usual. There were no after-effects noted in any case, with one exception,—that of a patient with tuberculosis, who slept seven hours and a half, after ½-drachm dose, and felt depressed on awakening. Most of the patients felt considerably refreshed, many of them decidedly so. There was no disturbance of the stomach or of digestion, with one exception, where a patient with endometritis complained of pain after taking a dose of ½ drachm. Doses of 45 minims, and even 60 minims, produced no depression on the circulation or respiration,—a very different effect from that of large doses of chloral. A patient with delirium tremens became drowsy in a few minutes after taking a drachm, but soon had to be quieted by other remedies. A case of typhoid fever with active delirium, almost maniacal, was unaffected by 40 minims, but was immediately quieted by hydrobromate of hyoscine. Pain or cough, if severe, was not much relieved, though a soothing effect was sometimes observed.

Conclusions.—1. The effects of somnal are much more striking and certain than those of urethan, and far less depressing than those of chloral.

2. There is no vertigo or depression after taking somnal, such as may follow the use of sulphonal.

3. The action of somnal is usually very prompt, and doses of ½ drachm, disguised in a little syrup of tolu or whiskey, are always well borne, easily taken, and entirely without deleterious effect.

4. The drug, in doses of a drachm, is not powerful enough to decidedly control delirium tremens, maniacal delirium, or severe pain.

5. In doses of 30 or 40 minims somnal is a safe and reliable hypnotic for ordinary insomnia.

TREATMENT OF CHOREA BY EXALGIN.

In the *Bulletin Général de Thérapeutique*, November 30, 1890, DR. MONCORVO writes that shortly after the first employment of antipyrin in the treatment of chorea by Wolner in Germany in 1887, and in France in 1888 by Legroux, that he had tested this remedy in cases of chorea, and had met with seven instances in which cure was readily

produced by this agent. He had noted in the case of his youngest patients a remarkable tolerance towards antipyrin, ninety grains being given in a day without producing the least disagreeable symptom. Although, the author writes, he was highly satisfied with his success in the employment of this remedy in chorea, he was led recently to test the action of a new amidogen, a derivative of the aromatic series methylacetanilide or exalgin. At first his employment of this remedy was simply as an analgesic, and he found that he might give to his youngest patient a daily dose of 4½ grains without any inconvenience resulting. His success with this employment of exalgin was so marked that he was led to test its value in various other nervous cases. One was that of a boy, 9 years of age, of a highly nervous disposition, who for a long time had been affected with polyuria, complicated with nocturnal incontinence. In this case antipyrin had been given in the dose of 45 grains daily, and had somewhat reduced the quantity of urine, but there had been no effect on the nocturnal incontinence. The author then administered exalgin in the dose of 3 grains with a still more marked reduction in the polyuria and more improvement in the nocturnal incontinence of urine. The next case was that of a child, 8 years of age, of a highly nervous, inherited disposition. He presented a marked case of chorea, which was entirely cured within eighteen days of treatment with exalgin. Although these single cases, of course, cannot be regarded as conclusive evidence, they indicate perhaps a useful addition to our list of remedies.

AN IMPROVEMENT IN INTERNAL PHLEBOTOMY.

In a recent issue of the GAZETTE we published an account of a method of bleeding in some forms of pulmonary congestion recommended by Dr. Christian Simpson. This article has led to the appearance of a publication by DR. GEORGE HARLEY in the *Lancet* for November 29, 1890, in which he confirms the effectiveness and value of this method of phlebotomy, recommending, however, a slight modification in the mode of procedure which will make the plugging of a wound by the coagulum still more secure and effective. It is evident that when the stream of blood from the lung has been interrupted by stopping the mouth of the canula with the finger, the coagulum formed within it will be in a continuous mass with the one formed at the distal orifice of the instrument. So that on the withdrawal of the canula there will exist considerable danger of the small blood-clot that has formed between the extreme end of the canula and the lesion made in the tissue by the point of the trocar becoming detached from its surroundings and withdrawn along with the coagulum inside the canula, to which it will of necessity not alone be continuous, but likewise intimately adherent. In order to reduce this risk to a minimum, as well as the equal danger of any oozing of blood taking place from the walls of the passage after the removal of the canula, which bleeding would of itself to a certain extent tend to defeat the object held in view in encouraging the formation of the blood-clot, Dr. Harley proposes a simple modification in Dr. Simpson's mode of procedure, which will be equally applicable to cases of pulmonary and hepatic phlebotomy.

What is wanted is, of course, not only to encourage the formation of an intrapulmonary or an intrahepatic blood-clot, but at the same time to insure its fixation in the wound, in order to avoid all risk, after the withdrawal of the canula, of hemorrhage either into the pleural cavity on the one hand, or into the abdomen on the other. Dr. Harley's proposal is this: As the trocar has always to be thrust some distance into the tissues of the organ from which it is desired to extract blood, he thinks before placing the point of the finger on the mouth of the canula, with the view of arresting the blood-flow, it should be slightly withdrawn,—say, about half an inch or more,—in order to leave an empty passage wherein a sufficiently large blood-clot may form and fill the channel. In which case the surrounding tissues of the organ will, in contracting upon the clot, hold it so firmly by their own resilience that, on the withdrawal of the canula, it will break off from the end of the much larger mass within it, and remain as an effective plug in the wound. This is a point of greater importance in cases of pulmonary than of hepatic phlebotomy. For while the rigidity of the ribs makes it impossible for one to compress by means of a pad and binder the thoracic walls against the wound-orifice in the lung sufficiently firmly to preclude the escape of blood from it, in the case of the liver, on account of the wound being made in the outer surface and the abdominal parietes immediately over it being freely mobile, no difficulty whatever is experienced in bring-

ing the abdominal walls into firm contact with the orifice of the wound in the liver by the application of a bandage and compress, and thus effectually preventing after-hemorrhage. However, even in the case of hepatic phlebotomy, it is just as well to recommend taking the additional precaution of preventing, by the induction of the formation of an intrahepatic blood-clot, any possibility of internal bleeding occurring.

CARDIAC REMEDIES.

In a paper by Drs. Rummo and Ferranini, analyzed by Professor Sée in *La Médecine Moderne*, December 11, 1890, the authors show that when cardiac insufficiency is recognized the following questions should be asked :

1. If the insufficiency is due to an irreparable destruction of the myocardium.

2. If it is due to degeneration of its fibres.

3. Whether it is simply the result of a temporary enfeeblement and independent of all degeneration.

From these points of view Drs. Rummo and Ferranini have endeavored, through experimental studies, to determine which of the cardiac remedies have a special action on the vessels, which on the muscular apparatus, and which on the nervous system of the heart. If, for example, in a case of aortic stenosis one should prescribe a remedy which increases pressure by contraction of the peripheral blood-vessels, the result would still further conflict with the action of the heart ; for to a circumscribed contraction which interferes with the free exit of blood from the left ventricle is added a general stenosis resulting from the contraction of the blood-vessels produced by the remedy.

The authors have shown by their studies that certain remedies, especially caffeine and sparteine, particularly influence the enervation of the heart. Other remedies, such as helleborin and very particularly strophantin, produce a stimulating action on the myocardium, while they are without influence on the nervous system of the heart : nerium oleander, digitalin, erythrophleine act principally on the myocardium, while they are without influence on the nervous system, while cocaine and convallamarin act principally on the myocardium ; therefore the authors conclude that in cardiac cases, where there is loss of power in the heart, that caffeine and sparteine should be prescribed. When there is feebleness of the heart, occurring in patients suffering from insufficiency and from aortic stenosis, or whenever the resistance is situated in the systemic circulation, recourse should be had to strophantin, while in mitral stenosis, or where there is obstruction in the pulmonary circulation, recourse should be had to digitalis, adonidin, and convallamarin.

With these views Dr. Sée is in perfect accord, though he regards as an important omission the fact that iodide of potassium is not included in this group, since he believes that there can be no possible therapeutics of heart-affections which do not consider the diuretic action of this remedy and of lactose, and of the influence of the iodide of potassium on the organs of circulation.

THE VALUE OF HYDRONAPHTHOL AS AN ANTISEPTIC.

Hydronaphthol is said to be non-poisonous, non-corrosive, and non-irritant, while being at the same time a powerful antiseptic, and although it has been before the profession for some time, its exact status in medicine has been much more accurately established through some experiments published by Dr. Thomas H. Bryce, in the *British Medical Journal* for November 22, 1890.

This substance is one of the naphthol series, being a derivative of beta-naphthol, and occurs as a whitish powder of fine, flaky crystals, freely soluble in alcohol but extremely insoluble in cold water. In cold water it is not wholly soluble in two thousand parts, though it is much more soluble in hot water. There seems to be little doubt that many of the clinical failures which have attended the use of this remedy are attributable to its insolubility in water. Even in alcohol hydronaphthol is at once thrown out when the solution is stronger than one-twentieth, but if glycerin is added this precipitation is largely prevented, and Dr. Bryce has, accordingly, in his experiments, employed a solution made of one part of hydronaphthol dissolved in ten parts of rectified spirits, to which glycerin is added in sufficient amount to make a one per cent. solution.

Dr. Bryce's experiments were designed to test, first, the germicidal, and, second, the inhibitory power of hydronaphthol, employing a single organism in all the experiments, namely, *staphylococcus pyogenes aureus*, on account of its ready recognition by its distinctive color. The author's first series of experiments were conducted as follows :

Solutions of the antiseptic were made up in sterilized flasks with water which had been boiled for fifteen minutes on three successive days. This sterile solution was then inoculated with the organism, and after the required time had passed, two or three drops of the inoculated solution were transferred by a sterilized pipette or a sterilized platinum wire twisted into a little coil, to a quantity of melted gelatin in a large tube, which was then solidified in a thin film on the interior of the tube by rolling under a tap of cold running water. The tubes were set aside for a week, and the results noted.

The fallacy of contamination was avoided, first, by keeping the gelatin to be used for some time to prove that it was sterile; secondly, by carefully sterilizing all vessels and implements; and, thirdly, by using sterilized water for making up the solutions.

Results were controlled in every experiment by a number of (control) solutions treated in the same way, and made up with sterilized water containing rectified spirit and glycerin in quantities corresponding to the hydronaphthol solutions.

Negative results were thus confirmed, and the possibility of the spirit and glycerin in the solutions alone being antiseptic guarded against; again, the possible inhibition of the growth of the organism in the gelatin by the drops of hydronaphthol solution transferred to it was discounted by remelting a tube, which showed a negative result, reinoculating with the organism from a pure culture, and rolling as before. If the organism grew, the negative result was thus confirmed. Further, as the reaction between antiseptic and organism must be modified not only by the strength of the solution of the antiseptic, but by the dose of the organism and the length of time during which it is exposed to its action, the experiments were arranged to meet these three factors.

In addition he found that a solution of 1 to 500 was sufficient in fifteen minutes, 1 to 500 in one hour, 1 to 800 in twenty-four hours. In sterilizing these cultivations, and without going into the details of his experiments, his results seem to show that in hydronaphthol we have a powerful antiseptic agent which, however, cannot be employed in simple aqueous solutions, owing to its insolubility in water within the limits of its germicidal power. Yet some such method, as the author recommends, of preparing a solution of 1 to 400 yields reliable antiseptic effects.

THE TREATMENT OF MYXŒDEMA BY THYROID GRAFTS.

It is generally admitted that the condition described under the name of myxœdema is attributable either to degeneration occurring in the thyroid gland or to its removal in surgical operations, and experiments made on animals seem to have proved that myxœdema may be artificially produced by ablation of the thyroid gland, and that transplantation of a thyroid gland is capable of arresting the pathological process after its inauguration in this manner. Various authors have attempted to treat myxœdema in man by hypodermic grafts of the thyroid glands of the sheep, and the results have been sufficiently satisfactory to warrant a continuation of such experiments.

At the meeting of the Société Médicale des Hôpitaux, held November 14, 1890 (*La Tribune Médicale*, November 20, 1890), Dr. Merklen presented a patient in whom symptoms of myxœdema had developed at the age of 30 years. The patient was one of low grade of intelligence, but was not idiotic; she had for ten years previous to the development of the myxœdema suffered from persistent metrorrhagia, whose symptoms persisted for months without interruption. After having tried various tonic and hæmostatic treatments in vain, the author decided to practise the thyroid graft. Accordingly there was inserted in the right submammary region one of the lobes of a thyroid gland taken from a living sheep, only a few minutes elapsing between the extirpation of the gland and the introduction in the wound previously made in the breast of the patient. The operation was performed under the most perfect antiseptic precautions, and the wound healed by first intention. Three days afterwards the metrorrhagia was entirely arrested, and now, at an interval of seventy-two days, has not returned.

The experiments of Horsley, Albertoni, and Tizzoni all demonstrate that ablation of the thyroid gland in animals is followed by anæmia and augmentation of the number of leucocytes, while the blood presents a considerable diminution in the amount of oxygen contained in it; this demonstrates the fact that the thyroid gland plays a considerable *rôle* in hæmatopoiesis, and that the hemorrhage and anæmia observed in myxœdema are due to the atrophy or the absence of the thyroid gland.

While there is no doubt that in the author's

case marked relief was obtained, it is, of course, questionable whether this improvement would be permanent or not. The definite results must depend upon the ultimate fate of the transplanted gland. If it is not reabsorbed a definite cure can be hoped for. On the contrary, should the graft be reabsorbed, the state of affairs which existed before the operation will be apt to recur.

WET ANTISEPTIC DRESSINGS IN INJURIES OF THE HAND.

At the meeting of the Southern Surgical and Gynæcological Association, held in Atlanta, November 11, 12, and 13, 1890, DR. WILLIAM PERRIN NICOLSON, of Atlanta, Ga., read a paper on this subject (*Medical Record*, December 13, 1890).

After dwelling upon the importance of the subject, both from the stand-point of the future earning capacity of the patient and the large amount of financial compensation demanded from corporations, he stated that for seven or eight years past he had looked after the surgery of several railroads and manufacturing establishments, and in that time had been called upon to treat more than three hundred hand-injuries, representing all grades of injury, from slight contusion to complete destruction of the larger part of the hand. The especial point that was urged in the paper was the doctrine formulated by Verneuil,—never to use a scalpel in a hand-injury. The old teaching, that when a finger was crushed you should go far enough behind the injury to secure a sound flap and amputate, was pernicious in the extreme, and had cost thousands of fingers that would have been restored to usefulness. Only such parts as were actually destroyed and pulpified should be removed, and all the tissues to come away could be amputated with the scissors. Projecting pieces of bone could be removed with pliers until reduced to the level of the fleshy parts. In compound fractures the parts should be coaptated as well as possible, and the line of separation be determined by nature, and under strict antiseptic dressings. Such a slough was harmless. Another point to which attention was forcibly called was the utilization of blood-clot in filling up ragged injuries, and by its substitution the restoration of lost parts. When a finger was crushed off, the end should be trimmed with scissors, and the clot utilized in building up a tissue over the bone. In reference to dressings, Dr. Nicolson said that he had tried almost all varieties, and had finally obtained the most satisfactory results from keeping the parts constantly bathed in a non-poisonous antiseptic solution.

In dealing with these wounds they were first cleansed as well as possible, and then bathed in a sublimate solution. Over all wounds a piece of aseptic rubber tissue or oiled silk was placed, then iodoform and sublimate gauze, and finally over all a covering of rubber tissue, into which, at some convenient point, a small opening was made. The patient was then given a bottle of antiseptic solution to be carried in his pocket if moving about, and instructed to pour, at frequent intervals, enough into this opening to saturate the dressings. He uses almost exclusively listerine, combined with a small amount of carbolic acid, in the proportion of half an ounce of the former and half a drachm of the latter, in a six-ounce mixture. If there was much pain a small amount of aqueous extract of opium was added. These dressings were not disturbed until the third day, when they were removed under strict antisepsis, to preserve the integrity of the blood-clot. Wet dressings were substituted at the end of about a week by the ordinary antiseptic dressings kept moist by external covering of rubber tissue. Should sloughing occur, it is kept wet for a longer time with the antiseptic. Under this treatment pain was reduced to the minimum. Suppuration never occurred, and the separation of sloughs was facilitated by the warm moisture.

THE COURSE AND TREATMENT OF PURULENT PLEURITIC EFFUSIONS.

In a long contribution to the *Revue de Médecine* for November, 1890, PROFESSOR M. KIENER, of Montpellier, discusses the question of the natural course and treatment of pleuritic effusions, and especially those of the fibrino-purulent and wholly purulent forms respectively. His own experience, which has been extensive, proves that much greater success has attended the treatment of such cases in recent years than was formerly the case. He discusses the routine treatment of pleurotomy with antiseptic cleansing of the pleural cavity, and suggests that a constant practice of this kind is not necessary. The fibrino-purulent effusions are produced by the pneumococcus, the streptococcus pyogenes, or the tubercle

bacillus. The wholly purulent effusions are set up by the staphylococcus aureus or albus, either alone or associated with other forms of micro-organisms, and especially with the tubercle bacillus. He shows that the fibrogenous process of inflammation may be independent of the action of any micro-organisms, but that the subsequent changes which the effused fibrinous material is to undergo are largely influenced by their presence. Dead organized products may undergo softening, probably by the action of some ferment contained within them, and may become completely absorbed. Cultures made with fluids undergoing this process may cause liquefaction of gelatin without the smallest trace of any bacterial growth. The occurrence of fibrino-purulent effusions, following septic forms of pneumonia and inflammation of other organs, has been shown to have been closely associated with influenza and the presence of the pneumococcus, and illustrative cases are quoted by Professor Kiener in which pleurotomy and antiseptic cleansing have effected a cure. Examples of successful treatment of pleurisy following simple pneumonia are also given. He points out that where purulent effusion follows upon infectious disease it tends to localize itself, and the organisms which flourish within it do not penetrate deeply into surrounding structures, but, if allowed to remain undisturbed, the conditions become those of a local abscess, and the general system is gradually poisoned by the ptomaïnes engendered by the micro-organisms. In the case of multiple abscesses it is sometimes advisable to allow the pus to break its way into the bronchi. Pleurotomy is not always necessary, as simple puncture is sufficient in some cases, but if pus reaccumulates, the chest should be opened. The operation should not be done until the fluid in the pleura is entirely converted into pus. As a general rule, fifty or sixty days should be allowed to elapse between the onset of the pleurisy and the opening of the pleura. Adding fifteen days for the initial pneumonia and two months for the recovery, the whole case would last about four months and a half. Intrapleural injections of antiseptic fluids should be avoided if possible, and free drainage provided, care being taken to prevent the entry of fresh organisms. Neutral solutions may occasionally be required to wash away accidental accumulations, such as blood clots. Boracic-acid solutions should be used with caution. The wholly purulent effusions associated with the presence of staphylococcus aureus and albus are by no means so regular in their clinical course as the effusions following pneumonia. In none of the cases observed during the recent epidemic of influenza could the staphylococcus aureus be found in the fluids of any of the great serous cavities, unless there had been some direct communication between those cavities and the external air. In all cases the diplococcus pneumoniæ and the streptococcus pyogenes were discovered, whether any such communication existed or not. The pathogenic action of staphylococcus differs essentially from that of pneumococcus and streptococcus. The former gives rise at once to the formation of pus, while the other two are fibrogenous, and call forth at first a solid effusion of fibrinous material which liquefies subsequently. Staphylococcus behaves towards animal tissues as a peptonizing ferment, and not as a cause of coagulation. Its virulence is variable, but it is capable of retaining it for long periods. It grows luxuriantly in artificial cultivation, whereas the other forms do not. It is thus easy to understand why effusions set up by staphylococcus run such an irregular course, and are amenable only to antiseptic treatment.—*British Medical Journal*, December 6, 1890.

THE INDICATIONS FOR OPERATION IN ECTOPIC GESTATION.

At the meeting of the Southern Surgical and Gynæcological Association, held in Atlanta, November 11, 12, and 13, Dr. C. A. L. Reed, of Cincinnati, O., read a paper on this subject (*Medical Record*, December 13, 1890).

The paper starts out with the assumption that the only proper treatment of ectopic gestation is by laparotomy, or, more properly, colotomy. While the profession has become practically unanimous that this is the proper line of treatment, the indications for operation have been less definitely decided upon. This conviction is forced upon the observer not only by a study of the literature of the subject, but by encountering cases which have been advised against operation by their attending physicians until hemorrhage within the pelvis has threatened a fatality, which is but too frequently realized. The most legitimate excuse for this dilatory practice is to be found in the confusion which has arisen with regard to the supposed uniform casual relationship of ruptured ectopic gestation to pelvic hæmatocele, and the division of the latter into

"primary" and "secondary" rupture. These terms are unfortunate, and, as used in this connection, may be entirely arbitrary. Primary rupture is made to mean rupture beneath the peritoneum, instead of first rupture, as the etymology of the word would imply, while secondary rupture is made to mean rupture within the peritoneum, instead of second rupture; whereas an intraperitoneal rupture may be, and frequently is, a primary rupture, when spoken of with reference to the sequence of events in ectopic gestation. There would be no serious confusion even here, if we were not also taught to leave extraperitoneal hæmatoceles alone, to be taken care of by absorption, and if we did not add that, as these hæmatoceles are generally caused by ruptured ectopic gestation sacs, we are to relegate these cases also to the expectant plan of treatment. This conclusion is without warrant, and is responsible for hundreds of deaths annually from this one cause.

The treatment of ectopic gestation premises the diagnosis of this condition. This is obviously difficult, and in the majority of instances cannot be arrived at at all, or, if at all, only presumptively; but in all these cases conditions can be found in the pelvis, which, if not conclusive of extrauterine pregnancy, yet constitute conclusive indications for exploratory operation. The presumption of ectopic pregnancy can be arrived at before rupture chiefly by a history of previous sterility, by a previous amenorrhœa, followed after a few weeks by irregular hemorrhage, by increased tumefaction to either side or back of the uterus, and by the existence of false decidua within the uterus. The latter fact may be safely determined by the judicious use of the Emmet curette forceps. The diagnosis after rupture is essentially the diagnosis of internal hemorrhage. Time wasted either to determine the cause of that hemorrhage, or to find out if it be primary or secondary, is criminal. The thing to do is to cut down and operate. The position has been taken that time should be taken for the patient to rally from the shock. One of Dr. Reed's own cases died simply because he waited twelve hours for reaction,—a lesson which taught him the fallacy of the old teaching, and which has since saved life at his hands. The best way to overcome shock from internal hemorrhage is to stimulate the patient by giving ether, stop the drain by ligating the bleeding vessels, and rouse the nervous system by washing out the belly with hot water.

Dr. Reed's conclusions are: 1. The only proper treatment of ectopic gestation is that by abdominal section. 2. The operation should be done in cases before rupture as soon as the condition can be presumptively diagnosticated. 3. The operation should be done in cases after rupture as soon as the evidences of internal hemorrhage become apparent. 4. In cases in which the period of viability has already been reached without rupture, pregnancy should be allowed to advance to term before operation, but only under the closest possible vigilance. 5. In all cases the appendages from both sides should be removed, providing the condition of the patient will permit of the extension of the operation.

THE RÔLE OF THE LYMPHATIC CELLS IN PROTECTION OF THE ORGANISM AGAINST INFECTION OF BACILLI.

Among the various theories advanced to explain the phenomena of cure or of vaccination in infectious diseases there is one which is especially seductive on account of its extreme simplicity. According to this theory the white corpuscles, or the lymphatic cells, have for their function the protection of the organism against the infection of microbes. It is well known that these white corpuscles have the power of movement, of developing prolongations by means of which they seize foreign bodies and incorporate them in their own mass. They act in a similar manner towards microbes, and microbes once devoured by such cells are subjected to a true intercellular digestion, and are thus destroyed, and the name of phagocytes (from the two Greek words, φαγω, meaning "I devour," and κυτος, "cells") is accordingly given to such protoplasmic organisms. In order to verify this theory, DR. PHISALIX has recently undertaken in Professor Chauveau's laboratory a series of experiments with the microbe of anthrax on guinea-pigs, rabbits, and mice, and he reports his results before the French Académie des Sciences (*La Tribune Médicale*, November 20, 1890).

In order to safely arrive at accurate conclusions, the author's experiments were principally directed towards determining the effect of the anthrax bacilli in the lymphatic ganglia near to the point of inoculation, and he has arrived at the following results: He found that whether the animal died or lived the microbes were not destroyed in the lymphatic cells, for cultures made of such tissue in bouillon resulted in marked proliferation of the germs. In the blood, on

the other hand, they had completely lost their infective powers, for all blood cultures remained sterile. It would seem, then, from these experiments that if the lymphatic cells play a mere mechanical *rôle* in this connection their chemical action is less absolute. In all cases this action does not suffice in itself to destroy microbes, and it appears that the protection of the organism results from the influence exerted by the blood and its products of exudation on the vitality of the bacilli.

THE BROMIDE OF ETHYL NARCOSIS.

In the *Annals of Surgery* for November, 1890, Dr. F. H. Pritchard publishes an analysis of the experiments made by Dr. Haderup, in the Copenhagen clinic, with the bromide of ethyl as an anæsthetic. His conclusions being the basis of a lecture delivered before the Copenhagen Medical Society and printed in the *Bibliotek for Laeger*, B. 7, Bd. 7.

The speaker had used, in the course of about a year, this anæsthetic in one hundred cases and found it excellent in operations of short duration. It is easily used, free from danger, and without any disagreeable after-action; but one must be sure and have a good preparation. It is quite inexpensive. The speaker only has induced *primary narcosis*, —*i.e.*, he has only given it until anæsthesia was produced, and then removed it. In all patients with heart- and lung-diseases it is contraindicated; one patient with acute bronchitis was experimented with to see its action on the pulmonary mucous membrane, which, however, in this case was negative. All the operations were extraction of teeth; in most of the cases two, three, and once eleven teeth were extracted. In no case did the patient feel anything. The dose for adults has, as a rule, been 11 to 12 grammes, which is inspired at one time. Esmarch's mask was used, with a double cover, however, and indeed it must be so tight as to allow but little atmospheric air to get in. The speaker described in detail fifty cases of narcotization,—six men, thirty-six women, and eight children. This anæsthetic acts especially well in children. It induces nausea and vomiting, but less so than chloroform; it seems as though the time of the last meal had but little influence. In not a few cases excitation was noticed, but it was as a rule only slight. Nothing is said by the speaker on its influence upon the pulse. The pupils dilate according to the profoundness of the narcosis; in one case only were they contracted. Narcosis appeared, on an average, in children after thirty-two, in adults after forty-six seconds; it lasted, in the former, one, in the latter, one and a half minutes, but the analgesia may last somewhat longer. The general condition rights itself in a few minutes after; but not rarely the patients have nausea and vomiting after awakening. A little vertigo is very frequent, lasting, however, only a few minutes. This drug may, of course, be used in other minor surgical operations. Anæsthesia may be prolonged to ten and fifteen minutes, or the patient may be allowed to awaken and then be narcotized at once again. If anæsthesia be prolonged beyond ten and fifteen minutes, narcosis does not apparently continue, the patient becomes restless and the painful sensations seem to return. Bromide of ethyl has the advantage over chloroform of being less dangerous; over ether of being less inflammable as in operations where illumination or thermo-cautery is used. In the discussion which followed Dr. Haderup's lecture, Dr. Engelsen states that in very nervous patients he has gotten poor results as only an alleviation of pain, but no freedom from pain was produced. The patients also have a very badly-smelling breath for several days after narcotization. The muscles become only very slightly relaxed. Dr. William Meyer has used bromide of ethyl narcosis in a small number of operations on the pharynx and ear, in children as well as adults; in adults it was given while sitting, in children while lying. He used 5 to 20 grammes (80–320 gtt.) of the drug and as a rule induced only primary narcosis, which made its appearance after one-half and five minutes. None of the operations lasted over four minutes, and during that time there was always analgesia; in aural operations the narcosis was often continued during the operation. He has seen excitation more frequently and it has been longer lasting than in Haderup's cases; but movements, cries, etc., should not hinder one to begin or continue the operation, as nevertheless there is analgesia. When the arm falls down without resistance, analgesia was always complete. Disagreeable consequences were seen very rarely; once apnœa was remarked. The cyanosis of the face is quite distinct. He has seen more disagreeable after-effects than Haderup. The patients awaken quickly; but in about one-third of the adults there followed partly a sense of weight in the extremities, partly vertigo, and sometimes nausea. As a rule these effects soon pass away, but

not always; for in one patient there was headache lasting one day; in a second patient it lasted two days, and several were unable to go home alone. In children the after-action is less. In a child with very large adenoid vegetations a very violent hemorrhage took place from the nose, but this ceased the moment the child was raised up. In many cases everything goes on smoothly, and the remedy, in general, is excessively pleasant to administer and is to be recommended in private practice, as one may get on without an assistant. Dr. Haderup observed that also in every nervous woman he was always able to produce narcosis; he has heard no complaint of badly-smelling breath. He also mentions the want of muscular relaxation, seen, for example, if one will introduce a wedge between the teeth. He has also seen one case of apnœa. He has never had the patients complain of a sensation of cold, nor seen any sign of irritation of the mucous membrane of the air-passages.

THE ACTION OF STRONTIUM AND ITS SALTS.

Some time ago we published the results obtained by Dr. Laborde in a number of experiments made as to the effects of strontium and its salts on the animal organism and in *La Tribune Médicale* for December, 1890, he publishes a second series of experiments as to the comparative action of the salts of strontium and potassium compared with those of barium. The author has already shown that as compared with barium and potassium the salts of strontium are relatively innocuous, while the most interesting fact determined in the author's earlier experiments was the marked diuretic action which followed the administration of salts of strontium, especially the lactate and tartrate. From a number of experiments in this second series with the sulphate of strontium and the neutral sulphate of potassium in the first place, the neutral tartrate of strontium and the neutral tartrate of potassium, and, thirdly, the orthophosphate of strontium and the orthophosphate of potassium, the following conclusions are drawn:

Strontium seems to be absolutely innocuous, and given even in considerable doses to dogs is not only not incompatible with the good health of the animals, but even seems to be a stimulant to the appetite and nutritive function.

On the other hand, the similar compounds of potassium are markedly toxic even in small doses. The author has further been able to confirm his statement that both the tartrate and the lactate of strontium possess marked diuretic powers. Chemical examination as to the mode of elimination of strontium and its salts seems to show that it is removed both through the urine and fæces, while considerable quantities remain deposited in the liver and bones.

"URATOSIS," OR THE DEPOSITION OF CRYSTALLINE URATES IN THE TISSUES.

At the meeting of the Medical Society of London, held November 17, 1890, Sir William Roberts communicated a paper upon the Deposition of the Crystalline Urates in the Tissues, considered as a separate pathological incident, with a suggestion for a distinctive name (*Lancet*, November 28, 1890).

He stated that the occurrence of such deposits was usually regarded as pathognomonic of the gouty state, but the converse of this proposition was not accepted, and clinical observers had always recognized the existence of a pathological state—to which the names of suppressed, latent, or larval gout had been applied—in which no uratic deposits could be discovered. On the other hand, the collateral conditions associated with uratic deposits differed so much from each other that they certainly would never have been classed together as various forms of one and the same disease had there not been this single connecting link of uratic deposits. Again, although the arthritic troubles of gout might be reasonably attributed to the mechanical irritation of the uratic deposit, there were other visceral and nervous troubles, assumed to be truly gouty, which could not, with our present knowledge, be thus explained. Further, uric acid existed in the body of the gouty in two very different states,—namely, in a state of solution in the blood, and precipitated in the solid form in the tissues. To the former of these conditions the term "lithæmia" had been applied, and it was invoked to explain the occurrence of the visceral and neurotic disturbances just mentioned. It would probably be well, in the interest of clear conceptions respecting gout, and as likely to contribute to the promotion of definite lines of further investigation, if we were also to isolate in our minds the latter of these two conditions—the precipitation of the crystalline urates—as a detached and independent pathological occurrence, separate from all antecedent and collateral incidents, and erect it

into a precisely definable symptom or physical sign, apart from everything else. In doing this, we should only be repeating what had been already done in regard to glycosuria in diabetes, to albuminuria in Bright's disease, and in the separation of thrombosis from phlebitis. Following these precedents, he ventured to suggest that uratic precipitation should be separated from its associated connections, and that it should be known by the name of "uratosis." Such a name would express clearly and precisely the meaning intended to be conveyed, it would bring into clearer relief the distinction between uric acid dissolved in the blood and uric acid precipitated as crystalline urate. The exact state of uric acid in lithæmia was not precisely known; it certainly did not exist in the free state, but whether it were quadrurate, or biurate, or a mixture of the two, or sometimes one and sometimes the other, was not known. On the other hand, in uratosis we knew exactly what we had to deal with, for uratic deposits were always composed of crystalline sodium biurate, and nothing else. Lithæmia was only the exaggeration of a normal condition, but uratosis, even in the minutest degree, was pathological. Further investigation might reveal the fact that the visceral neuroses were not the result of any diffuse lithæmia, but were the consequences of actual uratosis, though microscopic in amount. Experiment had convinced him that in some rare cases of gout the blood might become so laden with uric acid as to be within striking distance of a general uratosis throughout its entire mass. The establishment of the possibility of such a condition would enable us to explain the occurrence of some very obscure incidents in the history of gout. The adoption of the new name would also enable us to discuss more freely and with greater precision of language the true relation of uratic deposits to the etiological factors which were concerned in their production; thus, in lieu of speaking of ordinary gout and of saturnine gout, it would be more accurate to speak of gouty uratosis and saturnine uratosis, for it was difficult to believe that lead poisoning produced the same constitutional diathesis as that which existed in true gout. It was much easier to imagine that the gouty diathesis and lead poisoning, while differing in all other respects, had this one tendency to uratosis in common. So with the analogy that could be drawn between uratic deposits and urinary concretions. A large group of cases of uric-acid gravel and calculus were the undoubted offspring of gout, but there was another group of cases, occurring chiefly among the poor and among the rice-eating populations, which had no kinship with gout, and were the result of a totally different set of etiological factors. Nevertheless, the clinical and pathological phenomena of the two, depending on the mechanical irritation of the concretions, were practically indistinguishable. Though some of the facts known with regard to the hereditary transmission of gout appeared to be against this hypothesis, yet the objection was answered by the fact that gout was not in reality a homogeneous nosological unity, but only a loose bundle of morbid tendencies, and these several tendencies might be transmitted in unequal degrees. It must be remembered that senescence, nervous shocks, local injury, and trophic changes were other factors which had considerable etiological force in the production of uratic deposits, and two or more of these might act in combination in determining the occurrence of uratosis. By the adoption of this name we should gain something in regard to a clearer apprehension of therapeutic indications; we could aim at minimizing the incidence of the predisposing cause, or we could aim directly at the uratosis itself. And should it turn out at last, after further inquiry and investigation, that there did subsist an absolute and invariable solidarity between uratic deposits and the gouty diathesis, we should lose nothing by adopting these proposals, but, on the contrary, should gain in facility of description and in clearness of conception in regard to the main incidents of the gouty state.

The PRESIDENT would like to have heard an opinion expressed as to the permanence of these deposits; he himself was convinced that they were removable by alkaline waters, etc. He wondered what effect the supervention of a lithæmia would have upon an already existing uratosis.

SIR ALFRED GARROD said that it would be admitted that whatever might be the origin of gout, whether neurotic or not, all the symptoms were connected with lithæmia; and in regard to uratosis, it occurred in all cases of articular gout, grave or slight. In one instance he had demonstrated an abundant deposit in the joint of a man who had had but one attack, and that thirteen years before. He was not sure that in other non-articular cases there was a similar deposition of uric acid. All the cases were connected, not necessarily with a deposition, but with

a change in the urate of soda. In the eczematous fluid of gouty subjects there was no uric acid ; the inflammation appeared to destroy it. He gave his adhesion to the adoption of the name which the author had proposed.

THE PROGNOSTIC VALUE OF THE NUMBER OF RESPIRATIONS IN PULMONARY AFFECTIONS.

GERHARDT has noted exactly the number of respirations in one hundred and forty cases of pneumonia, and reports his results in the *Revue de Thérapeutique*, December 1, 1890.

He found that the number of respirations was markedly less in those cases which recover than in those which died, but that the number of respirations was of less importance in forming prognosis than the daily variation in the respiratory.

From this point of view Gerhardt divides his observations into four different categories :

1. In the first group the number of respiratory movements never becomes very high, 40 perhaps representing the average. Laennec had already observed that the number of respirations might remain nearly normal even with marked alteration of temperature, pleuritic pain, and marked diminution of the respiratory field. In all these cases the temperature was never very elevated and the pleura was not affected ; but, nevertheless, when it is considered that out of sixty-nine cases, which comprised that group, there were nine deaths, it is seen that the cases were of a severe type of pneumonia.

2. In the second group, which comprises fifteen cases, the number of respirations remained elevated throughout almost the entire duration of the disease. This series comprised nine cases and six deaths, and it was in this group that the respiratory movements were most elevated, amounting to 60, and on the first day to 90 respirations a minute. The fever also was very high, although cases of pneumonia with great respiratory increase did not necessarily imply a corresponding increase in the pulse.

The third and fourth groups comprise all the cases which during the course of pneumonia indicate a temporary increase in the respiration above 40 in a minute. These cases were fifty-six in number, and Gerhardt has divided them into two classes, according as the transient acceleration of respiration was observed at the end of the disease.

3. The third group, which comprises twenty-two cases, with acceleration at the commencement of the disease, includes three fatal cases. It thus seems that acceleration of respiration at the onset of the disease does not appear to seriously affect the prognosis, especially when it is recognized that the respiratory movement of 80 to 90 a minute is not incompatible with recovery. Nevertheless the phenomena noted appeared to retard defervescence, which ordinarily occurred on the eighth or ninth day.

4. In the fourth series the acceleration, which came on towards the end of the disease, persisted up to death, which occurred in ten cases out of twenty-two.

In twelve cases the acceleration commenced before the crisis, during it, or after it. When occurring after the crisis, it might persist for a few hours up to two or three days. In regard to these last two groups, it may be said that the influence of the fever is without effect on the respiratory rate, and that the summit of the respiratory curve is entirely independent of the elevation of the temperature. It is, however, quite different as regards the extension of the lesion. The extent in the inflammation then determines an augmentation in the respiration-frequency for many days before death, while the pulse at the same time becomes more frequent.

The respiratory frequency may also when fatal depend upon other circumstances, especially those which depend upon circulatory activity, such as occurs when pulmonary œdema takes place or the power of the heart becomes weakened. It is also possible that certain mechanical or chemical conditions may occur which might influence the number of respirations, but these cannot be accurately described. Every case of pneumonia implies an irritation of the pulmonary branches of the vagus nerves, to which should be added swelling of the bronchial ganglia, and the participation of the connective tissue of the diaphragm in the neighborhood of the phrenic nerve.

TREATMENT OF HYSTERICAL FITS.

According to the Paris correspondent of the *Lancet* for November 15, 1890, the weighty authority of CHARCOT denies that hysteria, in all its protean forms, is more common in France than elsewhere ; and certainly any one who has had the privilege of following the *clinique* of this master of neuropathology at

the Salpêtrière, and listening to the persuasive eloquence with which he maintains this thesis, cannot fail to have even a rooted conviction to the contrary at least severely shaken. Indeed, according to M. Charcot, there are few forms of mental or bodily derangement which hysteria is not capable of simulating to a nicety, and that not only in the female, but also quite as often in the male. That the French as a race are more emotional than either the English or the Germans is a matter of common remark, and to the casual observer this would seem in keeping with the apparently greater number of hysterical outbursts among females which are brought under one's observation in this city. Speaking from an experience of six years' residence, a woman in any form of hysterical fit in the streets of London is a rare occurrence, while a similar exhibition in the streets of Paris is—while short of being an every day phenomenon—at least not infrequent. The treatment of these attacks—which it is safe to assume are proportionately more common in private—is, therefore, a subject of considerable interest to our French *confrères*. M. Pitres has recently made some practical remarks in this connection. Having suppressed the fussy attentions to the patient, and released her from all the physical restraint which may have been exercised over her by anxious friends, he says the next duty of the physician is to search for the antispasmodic zones by commencing in those parts in which they most frequently are found,—viz., in the ovarian and epigastric regions. They do not always exist, however; but if they do, energetic pressure made upon them will bring the crisis to an immediate termination. Another efficacious manœuvre is prolonged and gentle compression of the eyeballs. This usually results in the production of hypnotic sleep. The patient may be left in this state until she awakes herself, or she may be awakened brusquely by blowing in her eyes. M. Bernheim, of Nancy, induces hypnotism by verbal suggestion. He tells his patient that she no longer suffers, that she is about to sleep, that she sleeps, that the crisis is past, and, finally, that she is to wake up. In most cases these imperative injunctions bring the fit to an end. Another therapeutic method, of which, according to Dr. Pitres, the efficacy is incontestable, is the application of the constant current. One electrode is placed on the forehead, the other indifferently on the abdomen or lower limbs, the battery being constructed so that it is possible to reverse the direction of the current; this is done two or three times, and is in general followed by immediate cessation of the convulsions. The current must, to be successful, be fairly strong,—30, 40, and even up to 80 elements of Trouvé's battery. He points out, however, that the chief drawback to this treatment is the fact that it rarely happens that a battery may be within reach. Chemical substances, on the contrary, are more easily procured, as a rule, and the inhalation of such substances as ether, chloroform, or nitrite of amyl is often successful. Enemata of solutions of chloral hydrate are also suggested, as well as (in some rare cases) hypodermic injections of morphine; but he points out that this latter drug must be used with great caution and circumspection, as hysterical subjects very readily develop the morphine habit. With a view of preventing a recurrence of the attacks, it is well to ascertain exactly what spasmodic zones the patient may have, and, should these zones be painful or easily excited, to apply ice-bags over them, or to spray them frequently with ether. Again, should there be antispasmodic zones, it is recommended to apply not only pressure to them at the time, but to keep this pressure up mechanically in a permanent form. Dr. Pitres would allay the excitability of the nervous centres by liberal doses of chloral, or, if necessary, morphine, but he makes no mention of the bromides. Should the patient be hypnotizable, he advises that it be "suggested" to her to have no further attacks within a given time. Dr. Pitres has had a curious experience with colored glasses in the treatment of this affection. He says there are certain colors which will actually provoke an attack, while he finds other colors again which either induce hypnotic sleep in a few seconds, or bring about a feeling of calm and comfort in an equally short time; and he cites the case of a young girl, a patient of his, with whom the wearing of spectacles with red glasses had the effect of inhibiting an attack, and much delaying the recurrence of another.

TREATMENT OF CONVULSIONS IN CHILDREN.

In a paper published in the *La Médecine Moderne*, December 18, 1890, the author calls attention briefly to the usual advice of at once removing the clothes of the child affected with convulsions before giving it a warm mus-

tard bath, with cold applications to the head. The seizure is very apt to come from the digestive tube, and thus production of vomiting by tickling the soft palate, or the administration of an emetic may be of service, or a full dose of calomel, or of castor oil, may be administered. It should also be remembered that perhaps an intestinal parasite may be the starting-point of the convulsion, and that a vermifuge may be indicated. When there is cerebral hyperæmia, the application of leeches behind the ears may arrest the convulsion, or in very vigorous children bleeding may even be practised with success. Mustard plasters may be perhaps of value applied to the lower extremities, or even the compression of the carotids, as recommended by Trousseau. Inhalations of chloroform may produce relief, but it will be usually only transient, and a repetition of its employment is not without danger. Bromide of potassium combined with chloral is especially reliable when the convulsions are obstinate, 7½ to 15 grains may be given to young children, 30 to 60 grains to children a little older, and 60 to 90 grains to children approaching adolescence. To new-born children the dose of chloral should be only ¾ grain; to nursing infants 2 grains; 3 to 5 grains to children of 2 years of age, and 6 to 13 grains to children between 7 and 12 years of age. When the convulsion has once been subdued it would be well to continue the use of the bromides, prescribing bathing the head with cold water, general friction, lukewarm baths, and strict regulation of diet. With this may also be combined small doses of calomel and the valerianate and oxide of zinc.

A NON-POISONOUS, NON-IRRITATIVE ANTISEPTIC DRESSING.

In practical surgery, since the introduction and general adoption of the antiseptic method of treatment, there has been but slight difficulty encountered in preserving an aseptic condition of the wound during the operation, and the methods now employed are so simple and effectual that a surgeon can be assured by a moderate amount of caution of performing an aseptic operation: there, however, exists the great question of preserving an aseptic condition of the wound throughout its subsequent progress to recovery, without which the performance of an aseptic operation is useless. Here it has been found that so many circumstances exist as to render the task a very difficult one indeed. That this has been and is generally recognized by surgeons is shown by the many dressings introduced within the few years antiseptic surgery has been in general use. The earlier dressings were of a most complicated and expensive nature, and entailed an immense amount of work, with the frequent result that, owing to their malapplication, the aseptic condition of the wound was not preserved. As the subject became more familiar, it was found that certain of the earlier antiseptics were not sufficiently destructive to bacterial life to render a less complicated method of applying the dressings possible, so others and more powerfully poisonous to bacterial life were introduced, resulting in a more simple and comparatively cheap dressing which was strongly antiseptic. But those dressings, owing to the poisonous nature of the drugs used, were found to have a highly irritative local action, which rendered their application in many cases impossible. To obtain a non irritative dressing which should at the same time possess great antiseptic properties has been the aim of surgeons for some time past.

In the *British Medical Journal* for November 8, 1890, is a paper published by Drs. Francis T. Heuston and Charles R. Tichborne, in which the authors state that some months since they commenced to experiment with naphthalin and sulphite of zinc, and the latter proved so successful that the authors claim that they believe they are warranted in recording that salt as non-poisonous, non-irritative, and highly antiseptic, while its application is extremely simple. In applying the dressing, a piece of gauze which is to be placed in contact with the wound is usually dipped in a weak carbolic solution, though this is not essential, and then three or four layers of dry sulphite of zinc are applied to the whole, being retained in position by a simple gauze bandage.

As far back as 1870 sulphite of zinc was introduced to the profession by Dr. Tichborne as an antiseptic, but his claims as to its value seem to have attracted little attention. Sulphite of zinc is best prepared by mixing in solution six parts of zinc sulphate and five and one-quarter parts of sodium sulphite. The new salt forms slowly and falls out as a white crystalline precipitate; it is very insoluble in water, but soluble in an excess of sulphurous acid.

Sulphite of zinc exists in two conditions of hydration, as a di- or tri-hydrate according to the temperature at which it is dried. When dried at 100° C., the composition of

the sulphite present will be $\cdot ZnSO_3 2H_2O$. When dry, sulphite of zinc is a perfectly stable compound. The usual method employed by the authors is to tinge the gauze with an organic dye, a fact which affords an easy way of determining whether the gauze, however old it may be, possesses its antiseptic properties. If a little gauze is placed in water and acidulated with sulphuric acid, it at once bleaches from the free sulphurous acid; when wet or in solution, it suffers a slow oxidation, and hence its antiseptic power. The gauze should first be thoroughly washed and boiled so as to sterilize it, and then upon this gauze is poured zinc sulphate and sodium sulphite in equal parts; when thoroughly mixed the whole is allowed to stand twelve hours. The zinc sulphite is deposited in and around the fibres of the fabric in microscopic crystals, but soft and even unctuous to the feel.

Sodium sulphate of zinc of course results in the deposition which follows the union of these two substances, and while the greater part remains in solution the gauze should be passed twice under rollers submerged in water with the object of removing all traces of this sodium sulphate which might remain. The gauze may be dyed with the twofold object of watching the progress of the discharges, and for the purpose of branding it distinct from other surgical dressings.

There are two points which are generally acknowledged, first, that sulphurous acid is one of our most efficacious antiseptics; second, that the antiseptic property of this acidulous radical is perpetuated through its salts. It has been shown that sulphite of zinc is always oxidizing when in solution, and that this unstable condition of sulphite results in the production of a fluid craving for oxygen, which is antagonistic to germ-life.

The paper is concluded by the report of seventeen cases of the various forms of major operation, in all of which union by first intention appears to have been obtained.

THE ACTION OF KOCH'S REMEDY ON INTERNAL ORGANS IN TUBERCULOSIS.

At the meeting of the Berlin Medical Society, held January 7, 1891, during the debate on Dr. Fraenkel's paper on Koch's treatment of tuberculosis, PROFESSOR VIRCHOW made an address the importance of which cannot be overestimated, and of which the following is a full abstract (*Lancet*, January 17, 1891, and *Berliner Klinische Wochenschrift*, No. 2, 1891):

Limiting his remarks to facts determined by anatomical investigation, Professor Virchow said that from the time at which the practice commenced until the end of December he had examined post mortem twenty one cases in which during life injections of Koch's fluid had been practised, and to these might be added some six or seven more examined during the present year. (A large number also have been examined by his assistants in other hospitals and elsewhere, and had yielded important facts.)

There is an obvious difference between those cases in which the changes taking place in superficial parts can be observed clinically and those where the internal organs are affected to an extent difficult to estimate by the careful clinical investigation; and it is of interest to contrast the latter with the former. Of the twenty-one cases referred to, sixteen were cases of phthisis in the limited sense,—*i.e.*, in which the lungs were especially involved. The remaining five cases comprised, 1, a well-marked case of tuberculosis of bones and joints; 2, a case presenting the rare concurrence of cancer of the pancreas with small, smooth-walled cavities in lung and apical induration; 3, an empyema in a puerperal case, which would probably have proved fatal apart from the injections; 4, pernicious anæmia, with very limited old lesions in lungs and tuberculous pleurisy; and 5, a case of arachnitis tuberculosa. In the remaining sixteen, strictly pulmonary cases, all showed more or less extensive phthisical ulceration.

Reserving for another opportunity a detailed statement of these cases, Professor Virchow proceeded to make some general remarks on the experience derived from them. Just as observation of external parts had shown that the remedy acts as a severe irritant, exciting redness and swelling, so the same effects had been well seen in the internal parts. He showed a preparation from a case of arachnitis tuberculosa in Henoch's clinic, in which there were also some old caseo pneumonic areas in the lungs (the probable focus of the meningeal metastasis), together with recent inflammatory changes. After four injections, amounting in all to two milligrammes, the last being sixteen hours before death, the patient (a boy 2½ years old) died. Professor Virchow did not remember ever having seen so "colossal" a hyperæmia of the pia mater, and even of the

brain itself. The pia matral vessels were extremely distended, and the brain-tissue of a dull reddish tint. In this, the only case of the kind in the series, he personally examined the tubercles in the arachnoid, but could detect no degenerative changes in them; they were well formed and of the ordinary character. Similar conditions of acute hyperæmia and swelling were also to be found in other internal organs. They had often noted an unusual deep injection of the granulation layers of old pulmonary cavities; sometimes a hemorrhagic infiltration of the walls, or evidence of recent hemorrhage into the cavity. In a man, 30 years of age, with an old rectal fistula and numerous tubercular ulcers in the colon, death followed upon hæmoptysis from an old ulcerating focus; he had been injected seven times, the last occasion when the hemorrhage set in, being thirteen days before his death. But these visible changes were not confined to such marked hyperæmic swellings, which obviously might be very transient, for there was not the least doubt that *actual inflammation*, with *active proliferation*, occurred to a considerable extent. This is well shown at the margins of ulcers and in the neighboring lymphatic glands, especially the bronchial and mesenteric. The glands were most markedly swollen, that form of medullary swelling peculiar to acute irritation and due to a rapid proliferation of the cells within the gland. This change is often associated with obvious leucocytosis, which may be assisted by the infiltration of white blood corpuscles around the tubercle. Sometimes these inflammatory swellings are dangerous. Thus, in the larynx, although the ulcers may become healthier, the neighboring tissue enormously swells, and may produce a critical degree of stenosis. Sometimes the change may assume a phlegmonous type, comparable to what is seen in œdema of the glottis and retro-pharyngeal abscess, as illustrated in a case seen this month (January). No doubt it is difficult to assert that any such inflammation is due to the injections, for there is no criterion for any differentiation; nor was he prepared to say precisely how this kind of inflammation may be recognized and distinguished from other inflammatory lesions arising in the course of phthisis. But in the lungs certainly there are lesions which are exceptionally peculiar.

Among the fatal cases of ulcerative phthisis the great majority showed widespread changes of recent date, mostly in the lungs, but also associated with pleurisy of very severe type, simple and tubercular, hemorrhagic, and not rarely bilateral. The lung changes may be separated into two seemingly very different categories. The one corresponds to what is styled "caseous pneumonia," or, anatomically, "caseous hepatization." It might be thought very doubtful whether this change was in any way connected with the injections. Professor Virchow would himself have doubted this were it not that some of the cases showed it in a special degree, and he exhibited a portion of lung which had undergone caseous hepatization to an extent the like of which he had not seen for years. The lungs were large, their lower lobes, especially the right, as voluminous as in ordinary hepatization; but the foci were so thickly massed as to leave hardly any parenchyma between them. It was like a piece of black sausage richly laden with fat. The non-caseous parts were blackish and sharply demarcated from the caseous. The man was 33 years old; he had had six injections, the last four weeks before death, and the injections were suspended because of supervention of continued fever and infiltration of the lower lobes. This infiltration started just after the injections, for previously there were only signs of induration at one apex, where was afterwards found an old indurated focus. In other cases, also, the condition of the lungs similarly differed from what is usually seen in phthisis; in five of the cases there were more or less large masses of caseous hepatization, but not approaching the extent of the case related.

Another change, which is certainly inflammatory, is of a more diffuse character, although again not absolutely distinctive. The types of pneumonia liable to arise in the course of phthisis may be placed in three different categories. There are the caseous, the ordinary fibrinous, and the *catarrhal*, so-called smooth pneumonias, marked essentially by cell accumulations in the alveoli. One may see all these forms in a case of phthisis, but in not one of the injected cases was simple fibrinous pneumonia present. In fact, the "injection pneumonia" resembles the catarrhal type, but with certain differences. Catarrhal pneumonia, as ordinarily met with in phthisis, exhibits a moderately fluid collection in the alveoli, which can only be slightly expressed from them. Sometimes the contents are much more watery, like brine, and it was this which led Laennec to speak of gelatinous infiltration preceding tubercular infiltration. But the product in these cases is not gelatinous; it is rather watery

and turbid; it might be called cloudy infiltration, and calls to mind a *phlegmonous* condition. In some parts it is more opaque; in parts it has a superficial likeness to caseation, but without its dry character, and there is no difficulty in distinguishing the two. The catarrhal phlegmonous condition is softer, moister, and laxer, as in a specimen shown, where around large ulcerating cavities in the apex of lower lobes were caseous masses and catarrhal inflammation. Two other specimens also showed caseous and catarrhal hepatization, which condition occurred in seven out of the sixteen cases examined last year. A further point of difference from ordinary catarrhal hepatization consists in the occasional occurrence of areas of softening in the midst of the hepatized foci, producing rapid excavation; for instance, in the middle of the lower lobe, just as in gangrenous broncho-pneumonia. This result seems to point to the operation of a stronger irritant than that which is usually regarded as the cause of catarrhal pneumonia. Professor Virchow is of opinion that, in some of these cases at least, the inflammatory processes are analogous to those excited in the external parts after injection, which vary in intensity with the individual and the special features of the case.

Another phenomenon has been noted which requires confirmation by thorough clinical observation; it is the outbreak of *recent tubercles* in these patients. He could only speak with much reserve on this point, since we have no fixed data as to the duration of small tubercles,—*i.e.*, the *submiliary form*,—and cannot judge positively as to their age. Generally they are regarded as being of recent formation. Clinical observation in certain cases has shown an eruption of tubercles on the laryngeal mucous membrane after injection. Small tubercles have become almost suddenly visible in places which appeared to be perfectly free from them, and they have rapidly given rise to fresh ulcers. It is asserted that this shows the tubercles to have existed prior to the injection, but that they have not been visible. They have been attacked and destroyed by the remedy, and thereby changed into ulcers. Professor Virchow was unable to controvert this statement as regards the recorded cases, but in his own examination of those parts, which he has always regarded as most suitable for the observation of these recent formations,—viz., serous membranes,—has revealed *the eruption of very recent tubercles under conditions which render it very unlikely that these were of old date.* This is especially seen in the pleura, pericardium, and peritoneum. He has never been able to confirm the notion that the tubercles were strongly attacked by the remedy and mortified, for in all these cases the submiliary tubercles in question were quite intact, even following injections made some weeks previously. Hence he is the more inclined to the notion that their eruption first took place *after* the injection.

Owing to the great difficulty in discriminating precisely these very fine forms of tubercle in the lungs themselves, he would speak only of regions, such as the mucous membrane of the larynx, where miliary tubercles first appeared after injection, or where after more prolonged injections quite recent tubercles have been seen in the membrane. He showed an intestine—procured this month—in which there was a very recent submiliary eruption in the vicinity of old ulcers; the patient, a man 41 years old, also had recent tubercles in the pericardium.

In endeavoring to explain these fresh eruptions, he remarked that if one admits that every tubercle is due to bacilli, the study of such remote parts as the pericardium deserves special attention. In another case the epicardium had at one spot, not in contact with the affected part of the lung, a small group of four such miliary tubercles surrounded by marked hyperæmia. There seemed no other explanation than that their germs had come there by metastasis; and why, he asks, should not the metastatic transferrence of liberated bacilli be deemed a source of more generalized infection? For Professor Koch states that the bacilli resist the action of the remedy, nor indeed are they destroyed, and therefore the possibility must be recognized that the softening process excited by the remedy makes the degenerative products more fluid and more liable to be carried away to create foci elsewhere. The idea is not far fetched, and is linked with another,—viz., the infiltration, under the treatment, of a whole lower lobe into foci of caseous hepatization, suggesting that material set free from the upper lobe by the destructive processes, and not coughed up, has been sucked into the lung, and has excited a kind of caseous "Shluck-pneumonia."

Professor Virchow said he felt bound to express these ideas in order to unite with them the warning that still greater caution should be used in operating on cases where the patient has not the strength or the habit

of completely coughing up the softened material, and where there is great possibility of the conveyance of this material to other parts of the lung to excite therein fresh foci. Another point on which Professor Koch lays stress as the main effect of his remedy is the destructive process itself. There is no doubt that such an action does take place in many parts; but it is not quite clear why this mortification does not always occur, as, for instance, in the cases of submiliary tubercles referred to. Professor Virchow admitted,—as had been described by some earlier observers,—in tubercular pleurisy, for instance, that, especially when the tubercles increased in size, they assume an unusually cloudy, yellowish aspect, and show definite microscopic changes. But at other times, even when injections are continued to the day before death, this change does not occur. Large tubercles may even appear very resistant. They had lately a very remarkable case of a boy, 3 years of age, with tuberculosis of the vertebræ and long bones, and where large tubercles were found in the brain. The injections had reached .012 gram. It was a surgical case, in which spinal caries with psoas abscess and much disease of the joints and bones of the lower limbs existed. At the necropsy there were as many as seven so-called "solitary tubercles"—*i.e.*, large caseous masses—in the brain and cerebellum; but neither in them nor in their vicinity were any marked changes to be seen. There were a few spots of softening, but not of special import, and certainly none of the nodules showed any marked destruction.

Professor Virchow next drew attention to the conditions observed in cases of phthisis, in *ulcers of the intestine* and in the *ulcers of the respiratory organs, especially in the lungs.* As regards the intestine, there could be no question as to the occurrence of mortifying processes similar to those observed in lupus, especially in the older ulcers of wide extent and thickened margins, where there is much fresh submiliary eruption to be seen together with extreme mortification. He showed the specimen from the case which also had pericardial tubercle, in which the destruction of the intestinal ulcer had invaded the serous coat. Had the man survived two days longer, perforation must have occurred. This was so in another case lately related by Professor B. Fraenkel where death occurred from perforation. Although such mortification and perforation do take place in tubercular ulceration, yet it was remarkable to have two such instances within two months of severe cases where the mortifying process was in rapid progress. The same is true of ulcers in the organs of respiration, in which very rapid destruction takes place, and the unusually large size of the detached masses must obviate the possibility of their being expectorated, and thereby favor their retention and aspiration with its consequences. Professor Virchow showed also a specimen of very severe laryngeal tuberculosis (from the same case as the pericardial and intestinal specimens referred to) in which twenty injections had been practised, the last on the day preceding death. The specimen showed a recent eruption, involving the whole extent of the larynx, of most exceptional severity. Another preparation showed recent caseous hepatization, from a case in which six injections were made, the last four days before death; another where three injections were made, the last one a week and a half before death, and in which cheesy foci and tracts of diffuse inflammation were present; and, lastly, a preparation obtained that morning, showing a spreading abscess in the lung, starting from bronchiectasis in the lower lobe.

THE COMPOSITION OF PROFESSOR KOCH'S REMEDY FOR TUBERCULOSIS.

The following is a translation of PROFESSOR KOCH'S second communication on the action of the remedy for tuberculosis, with an account of his method of preparation of the remedy (*British Medical Journal*, January 7, 1891, and *Deutsche Medicinische Wochenschrift*, January 15, 1891).

"Since the publication of my experiences with a new remedy for tuberculosis two months ago, many doctors have been put in possession of the remedy, and have thus been enabled to make themselves acquainted with its qualities by their own experiments. As far as I can judge by the publications that have appeared on the subject, and the letters addressed to me, my statements have, on the whole, found full confirmation. That the remedy exercises a specific action on tuberculous tissue, and can in consequence be employed as a very delicate and certain reagent in searching out hidden, and diagnosticating doubtful, tuberculous processes, is agreed on all sides. And in regard also to the therapeutic effect of the remedy, most accounts agree that, in spite of the relatively short duration of the treatment, many patients show improvement, varying only in degree.

In not a few cases I am informed that cure even has been attained. Only in some exceptional cases has it been affirmed that the remedy may not only be dangerous in too far advanced cases,—which is freely admitted,—but that it directly hastens the tuberculous process; that it is, in fact, harmful *per se*. I myself have had the opportunity during a month and a half of collecting further experiences regarding the therapeutic effect and the diagnostic value of the remedy in about one hundred and fifty cases of various forms of tuberculosis, and I can only say that all I have lately seen is in harmony with my former observations, and that I have nothing to retract of what I have before stated. So long as the only point of importance was to judge of the correctness of my statements, it was not essential to know what the remedy contains and what its origin is. On the contrary, it was clear that subsequent experiments would be all the more unprejudiced the less was known of the remedy itself, but now that such experiments in sufficient number have been made, and have proved the importance of the remedy, the remaining task is to study the remedy beyond the application it has hitherto found, and if possible to apply the principles which lie at the foundation of its discovery to other diseases. This task, of course, demands a full knowledge of the remedy.

"I therefore think the right moment has come to make the necessary statements which follow before I discuss the remedy itself. I think it imperative for the better understanding of its action to trace shortly the steps that led me to its discovery. If a healthy guinea-pig be inoculated with a pure cultivation of tubercle bacilli, the inoculation wound generally becomes sealed, and seems to heal up during the next few days. It is only in the course of from ten to fourteen days that a hard nodule is formed, which soon opens, forming an ulcerating spot, which persists until the death of the animal; but the case is very different if an already tuberculous animal be inoculated. The most suitable animals for this experiment are those that have already been successfully inoculated four to six weeks previously. In the case of such an animal also the small inoculation wound becomes sealed at first, but no nodule is formed, a peculiar change taking place at the point of inoculation. Already, on the first or second day, the spot becomes hard and dark-colored; and this is not confined to the point of inoculation, but spreads around to a diameter of .5 to 1 centimetre. During the next few days it becomes more and more clear that the epidermis thus changed is necrotic. Finally, it is thrown off, and a flat, ulcerated surface remains, which generally heals quickly and completely, without carrying infection to the neighboring lymphatic glands. Thus the inoculated tubercle bacilli act quite differently on the skin of a healthy guinea-pig and on that of a tuberculous one. But this remarkable action does not belong exclusively to living tubercle bacilli, but also in the same degree to dead ones, whether killed by low temperatures of long duration, which I at first tried, or by boiling heat, or by certain chemicals.

"This peculiar fact having been ascertained, I followed it up in all directions, and it was then further found that pure cultivations of tubercle bacilli thus killed, after they have been ground down and suspended in water, can be injected under the skin of healthy guinea-pigs in large quantities without producing anything but local suppuration. Tuberculous guinea-pigs, on the other hand, can be killed by an injection of very small quantities of such suspended cultures, the time being from six to forty-eight hours, according to the dose; a dose which is just insufficient to kill the animal is sufficient to produce a widespread necrosis of the skin in the region of the point of inoculation. If the suspended matter be still more diluted, so that it is scarcely turbid to the eye, the animals remain alive; and if the injections be continued at intervals of one or two days, a noticeable improvement in their condition soon sets in; the ulcer at the point of inoculation becomes smaller, and finally cicatrizes. This is never the case without such treatment. The swollen lymphatic glands become smaller, the condition as regards nutrition improves, and the progress of the disease is arrested, if it is not already so far advanced that the animal dies of debility.

"These facts formed the foundation of a therapeutic method against tuberculosis. But an obstacle to the practical employment of such suspensions of killed tubercle bacilli was found in the phenomenon that the tubercle bacilli are by no means reabsorbed, nor do they disappear in any way, but for a long time remain unchanged in their position, producing smaller or larger suppurating centres. Thus it was clear that in this method the curative effect on the tuberculous process is obtained by a soluble substance, diffused, so to speak, into the fluids that surround the tubercle bacilli, and transferred without delay to the circulating fluids of the body, whereas that which

has the pus-forming quality seems to remain behind in the tubercle bacilli, or, at any rate, to be only very slowly dissolved. Thus the only important thing to be done was to carry out the process which takes place within the body *outside* of it also, and, if possible, to extract and isolate the curative substance from the tubercle bacilli. This probably required much work and time before at last I succeeded, by the help of a forty to fifty per cent. solution of glycerin, in extracting the active principle from the tubercle bacilli. My further experiments on animals, and finally on human beings, were made with liquid thus obtained, and in this way also the liquid which I let other physicians have in order to repeat the experiments was obtained. The remedy with which the new therapeutic treatment of tuberculosis is carried out is, therefore, a glycerin extract of pure cultivation of tubercle bacilli.

"Besides the active principle there pass from the tubercle bacilli into the simple extract all other substances soluble in fifty per cent. glycerin, and therefore there is found in it a certain quantity of mineral salts, pigment, and other unknown extractive substances. Some of these substances can be removed from it without difficulty, for the active principle is insoluble in absolute alcohol, and can be precipitated by it, not pure, it is true, but in combination with other extractive substances likewise insoluble in alcohol. The coloring-matter, too, can be separated out, so that it is possible to obtain a colorless dry substance from the extract, which contains the active principle in a much more concentrated form than the original glycerin solution. But this purifying of the glycerin extract has no advantages as regards practical application, as the substances thus removed have no action on the human organism, and the process of purifying would, therefore, only cause unnecessary expense. The constitution of the active principle can as yet be only a matter of conjecture. It seems to me to be a derivative of albuminous bodies, and to be in close relation to them, but it does not belong to the group of so-called toxalbumens, as it can withstand high temperatures, and in the dialyzer passes quickly and easily through the membrane. The quantity of active principle present in the extract is, in all probability, very small; I estimate it at fractions of one per cent. Thus, if my assumption be correct, we have to deal with a substance the action of which on the tuberculous organism far surpasses that of the strongest drugs known.

"Various hypotheses may, of course, be formed as regards the specific mode of action of the remedy on tuberculous tissue. Without in any way affirming that my view is the best possible explanation, I imagine the process to be as follows: The tubercle bacilli in their growth produce in the living tissues, just as in the artificial cultivations, certain substances which have various but always deleterious influences on the living elements of their surroundings,—the cells. Among these substances is one which, in a certain concentration, destroys living protoplasm, and causes it to undergo a transformation into the condition called "coagulation-necrosis," by Weigert. The tissue having become necrotic, this condition is so unfavorable to the nutrition of the bacillus that it is unable to develop further, and finally in some cases it dies off. In this way I explain the remarkable phenomenon that in organs freshly attacked by tuberculous disease—for instance, in a guinea-pig's spleen or liver filled with gray nodules—numerous bacilli are found, while bacilli are rare or entirely absent when the enormously-enlarged spleen consists almost entirely of whitish substance in a condition of coagulation-necrosis, such as is often found in guinea-pigs which die of tuberculosis. A solitary bacillus, however, cannot produce necrosis at a great distance, for as soon as the necrosis has reached a certain extent, the growth of the bacillus, and, in consequence, the production of the necrosis-producing substance, diminishes, and thus a sort of mutual compensation sets in, and to this it is due that the growth of isolated bacilli is so remarkably restricted, as, for example, in lupus, in scrofulous glands, etc. In such cases the necrosis only extends over a part of the cell, which then, in its further growth, assumes the peculiar form of a giant cell. I thus follow in this statement of my views the explanation of the growth of giant cells first given by Weigert. Now, if the necrosis-producing substance were artificially added to that contained in the tissue surrounding the bacillus, then the necrosis would extend further, and thus the conditions of nutrition of the bacillus would be much more unfavorable than is usually the case. Then not only would the more completely necrosed tissues disintegrate, slough, and—where this is possible—take with them the enclosed bacilli, carrying them outward, but the bacilli would also be disturbed in their growth to such an extent that they would die off sooner than is the case under ordinary conditions. It is in calling forth such changes that to my mind the action of the remedy seems to consist. It contains a certain amount

of the necrosis-producing substance, of which a correspondingly large dose has a deleterious influence—even in healthy persons—on certain elements of the tissues, probably on the white blood corpuscles or cells closely related to them, thus giving rise to the fever and the whole peculiar complex symptoms. In tuberculous persons a much smaller quantity suffices to cause, at certain spots,—that is, wherever tubercle bacilli vegetate and have already impregnated their surroundings with the necrosis-producing substance,—a more or less extended necrosis of cells, with the accompanying symptoms affecting the entire organism. In this way it is possible to explain—at least for the present—in a provisional way the specific influences which the remedy in certain well-recognized doses exercises on tuberculous tissue, as well as the possibility of increasing the doses in so remarkable a fashion; and, finally, to explain the curative effect which the remedy undoubtedly possesses where the circumstances are at all favorable."

Reviews.

CYCLOPÆDIA OF THE DISEASES OF CHILDREN, MEDICAL AND SURGICAL. THE ARTICLES WRITTEN ESPECIALLY FOR THE WORK BY AMERICAN, BRITISH, AND CANADIAN AUTHORS. Edited by John M. Keating, M.D. Vol. I.
Philadelphia: J. B. Lippincott Company, 1890.

A work of the high aims of the present cyclopædia must to-day be as nearly perfect as skill and research can make it to insure a successful reception. It must mirror, up to the day of its publication, the most advanced discoveries of the time; must be, till displaced by subsequent work and investigation, an absolute authority. How well the authors—"American, British, and Canadian"—have labored, how perfect their work is, the student and practitioner can only discover by patient reading and study. But the names of the authors are a warrant that they are eminently fitted for the task, since in many cases they are already well known for honest and excellent work in the special branch of which they treat.

Part I. of Vol. I. is devoted to "General Subjects," and contains excellent articles on "The Anatomy of Children," by Geo. McClellan, M.D.; "The Physiology of Infancy," by Angel Money, M.D.; "Diagnosis," by James Finlayson, M.D.; "The Influence of Race and Nationality upon Disease," by J. Wellington Byers, M.D.; "Outlines of Practical Bacteriology," by E. O. Shakespeare, M.D.; and we may remark that, as a professed cyclopædia of diseases of children, this work embraces a vast amount of information equally applicable to adults. "Maternal Impressions," by Wm. C. Dabney, M.D.; "Diseases of the Fœtus," by Barton Cooke Hirst, M.D.; "The Care of the Child at and immediately after Birth, in Health and Disease," by R. A. F. Penrose, M.D.; "Closure of the Ductus Arteriosus and of the Umbilical and Hypogastric Arteries," by J. Collins Warren, M.D.; "Injuries of the New-Born," by Theophilus Parvin, M.D.; "Infant-Feeding—Weaning," by T. M. Rotch, M.D.; "Wet-Nurses," by Wm. H. Parrish, M.D.; "Diet after Weaning," by Samuel S. Adams, M.D.; "Nursing of Sick Children," by Miss Catharine Wood; "Nursery Hygiene," by L. M. Yale, M.D.; "Dentition," by John Dorning, M.D.; "Puberty: Its Pathology and Hygiene," by Thos. Moore Madden, M.D.

We have enumerated the articles in Part I. and their authors because in many respects this portion of the work is most distinctive. These articles are all excellent monographs. It would be almost unfair to discriminate, but perhaps the reader, like the reviewer, will be especially attracted by the article on "Diagnosis." This is not only erudite, but captivating. "Influence of Race and Nationality" is another attractive subject which has been wonderfully well handled. Dr. Penrose has embodied in his article all the vast experience of which he is master, and "Infant-Feeding" is a complete epitome of the best knowledge on the subject, and though Dr. Finlayson very properly derides the early diagnosis of "teething" as one that covers ignorance and carelessness in the practitioners, Dr. Dorning will show us exactly what mischief abnormal teething may do in his article on that topic.

Part II. is devoted to "Fevers and Miasmatic Diseases," and opens with an article by Dr. Wm. Pasteur on "Fever." This portion of the volume, with slight exceptions at the end, travels the beaten path,—typhoid, typhus, and relapsing fevers, etc. All the articles are excellent.

"Diphtheria," by Dr. J. Lewis Smith, is, as might be confidently expected, a monograph of the greatest value to the student and practitioner. To the easy and captivating style the author has united great information, great experience, and thorough work. All that we know of diphtheria, past and present, he

gives us, with the grace and force of the true writer, who, having assimilated all knowledge, makes it forever his own. The author draws a happy picture of the primeval America, free, till European invasion, from all the contagious diseases which the world has derived from the distant and mysterious East, and among them all he places diphtheria first as the most deadly, the most persistent, and distressing. He says, "It is to be, from appearance, above all other maladies, the scourge of America in the future." These grave words add additional force to the thorough study which he gives of disinfection, on which alone we must rely for any hope of displacing the pest which has fastened on us.

The thermometry of diphtheria he considers as still involved in mystery. Temperature tells us less than in any other disease. Its use is mainly to tell us of the amount of local inflammation and its severity. Nasal diphtheria the author acknowledges to be difficult of early diagnosis, and often exists unsuspected. He does not mention the fact that suspicion should be excited by enlargement of the lymphatics of the neck, posterior to a line dropped from the lobe of the ear, swelling anterior to this being carried by deposit on the tonsils and pharynx, nor does he hint at the possibility of nasal diphtheria being a variety of the disease due in many cases, perhaps in all, to contagion primarily derived from animal diphtheria. His observations on diphtheritic paralysis are the best we have met with, and he reminds the reader that the worst cases of diphtheria which die, would, if they survived, probably have the most marked paralysis. A hint to which the reviewer would add, that the rather remarkable frequency of paralysis after apparent recovery under the mercurial treatment,—a frequency which has been used to disparage that treatment,—only shows that mercurials, used as at present, rescue desperate cases, which, under other methods, would have perished, and given no signs of paralysis in consequence.

Diphtheria gives, as Dr. Smith says, the largest number of cases of heart-failure of any disease; but, in view of the world's recent experience with influenza, we would prefer to modify the statement to "*fatal* heart-failure," since influenza afforded multitudes of cases where the heart weakness was just barely compatible with life.

"Pertussis," by T. M. Dolan, M.D., F.R.C.P., is a rather gloomy chapter. The author is by no means enthusiastic on the therapeutics of whooping-cough, and entertains a somewhat low opinion of the various remedies advanced of late. He alludes to the recklessness of the general public in regard to a disease, which, he says, is the third cause of death in London among the diseases of infancy, but not so many years ago. It held for a long time the place of third in the general London mortality, as it did in New York and Philadelphia. Since which, in the latter cities at least, it has descended very much lower in the list; in fact, there is scarcely a disease in which therapeutics has shown so much usefulness as in whooping-cough. With the discovery of the virtues of belladonna the work began, and there are now at least six remedies unknown thirty years ago, any one of which is vastly more efficacious than the accumulated Pharmacopœia before that time. The author mentions the burning-sulphur cure, which many have used with success, but does not speak in favorable terms of quinine, which will do marvels if used boldly and in *solution*, since in pill form it is quite useless. Belladonna and alum are his main reliance, with the ordinary treatment for catarrh in the early stages. Spraying the fauces with various agents is barely alluded to, and no mention is made of the spray of bichloride of mercury, 1 in 10,000, which certainly allays the paroxysms, and, in the opinion of some recent observers, often shortens the disease.

In "Variola," by A. D. Blackader, M.D., we have a very good article, as suitable for adult variola as for that of children. The writer of the article fails in his short historical sketch of the disease to allude to the interesting fact that, prior to vaccination and the time of Jenner, variola was always classed as a disease of infancy and childhood, along with measles, pertussis, etc. This fact, which of itself proves the efficacy of vaccination, is at least worthy of passing notice. The author believes that any treatment which tends to prevent the full natural expression of the eruption, more or less endangers life.

Dr. W. T. Plant, who writes on "Vaccination," has evidently not studied Dr. Crookshank's recent work on the "History and Pathology of Vaccination," else would he have moderated somewhat his praises of the illustrious Jenner, and have been obliged to take a somewhat wider though less self-satisfied view of the whole subject. Especially would he have somewhat modified his remarks on the "degeneration of lymph" and "forms of lymph."

"Rheumatism" and "Malaria" are two remarkably able articles, and Dr. Guiteras has given us another on "Yellow Fever." This probably will not in our immediate section of the country be of practical value, but for the physicians of the South is invaluable.

Dr. Wm. Wright Jaggard's article on "Joined Twins" is somewhat of a variety. It, like many other articles in the book, is profusely illustrated, and contains considerable new matter on this interesting subject.

Dr. Bartholow, in "General Therapeutics of Children's Diseases," has given us an extremely scientific treatise.

Taken all in all, we think that Vol. I. fully sustains its claims, and that until displaced by some newer work, it deserves to rank first in the estimation of the profession. The articles are all good, and many of them are above mere praise. Their field is so wide that their influence on the profession will reach far beyond their mere bearing upon the diseases of infancy and childhood. Teaching no limited specialism, but giving us a grand, broad view of disease as something which links together child and adult, young and old, and with which we are to contend on principles which affect all ages and all races in all the varied climates of the world. E. W. W.

Correspondence.

PARIS.

(From our Special Correspondent.)

Koch's Lymph in France—Hypnotism in the Hospitals and before the Courts—Poisoning by Chloride of Barium—Retinol as a Phosphorus Solvent—Opium Eruptions.

Koch's lymph has, of course, been the object of many experiments in America; hence the results of similar investigations made here cannot fail to interest you. As regards its value in the treatment of lupus, an important preliminary report has been presented to the Society of Dermatology and Syphilography by a commission of physicians attached to the St. Louis Hospital. Thirty-two patients were inoculated, beginning from November 30, 1890. Some of the features observed are reserved for a future report, but, for the present, the attention of the association has been called to the following points so far established,—viz., 1, irregularity of the general action; 2, its dangers; 3, precautions necessary to avoid, or, at least, lessen, such dangers. Respecting the first point, the committee found the general reaction to be far from possessing the schematic characters announced by Koch. The local reaction, besides, was not always proportionate to the general. For instance, a young girl, 14 years of age, at the Necker Hospital, after three inoculations, still presented intact a large nodule of myxomatous lupus, the most characterized type of tuberculous lupus. In several patients an intense reaction was seen to follow the injection of half a milligramme of the lymph, and very different effects proceeded from the same doses. A woman, inoculated three times, at ten days' interval, with two milligrammes, was, after the third operation, taken with symptoms which nearly carried her off,—namely, pulmonary congestion, hæmaturia, scarlet-like rash with vesico-pustules and purulent blebs. Lastly, the febrile reaction much differed in length with different patients. 2. Dangers of the general reaction. The lymph produces the effects of a very active pyretogenous agent, spreading congestion and inflammation through the whole economy, but in a very unequal manner. The diseased organs are the most likely to be congested, but viscera, apparently most healthy, may equally suffer. Bronchial and pulmonary congestion are most frequent. Symptoms of myocarditis and endocarditis have been often observed; also albuminuria and hæmaturia, as well as a tumefaction of the face resembling erysipelas. 3. Precautions. It has been found necessary to gradually decrease the injections and lengthen the intervals between them. The beginning dose should be ½ milligramme, to be increased by ½ milligramme until the reaction brings the temperature up to 39° C. (102° F.). For the subsequent injections the dose should not be increased as long as the temperature mentioned is attained. There should be from four to eight days' interval between the injections.

As regards tuberculosis, especially since the last reports from Germany, physicians feeling very reluctant to try the remedy on man, and patients in some hospitals having absolutely refused to submit to any lymph inoculation, another procedure has been resorted to. Steps have been taken for a full systematic trial of the remedy on animals, and as cows are subject and often victims to tuberculosis, agricultural societies have, at their own expense, undertaken to supply the ways and means to carry on the experiments in a thorough scientific manner. Eminent physicians and veterinarians, under the direction of Professors Ver-

neuil, Chauveau, Cornil, Villemin, and others, have taken the matter in charge, and will proceed on the plan that was so successful when Pasteur's charbon vaccine was first presented and placed on trial. It will be substantially as follows: Three lots, of five cows each, will be selected and set apart. Tuberculosis will be communicated, at the same time, to the animals of the first two lots. As soon as the first set of cows indicate that the disease has affected their system, they will be immediately inoculated with the lymph. The changes noted will indicate the effects of the remedy on tuberculosis in the first degree. For the second set of cows, the lymph will be injected only two months after the disease has become manifest. The second observation will thus bear on animals suffering from the affection in the second degree. The third set will not be submitted to tuberculosis infection, but kept to serve as points of comparison with the others, and later on, if still in sound health, will be inoculated with Koch's lymph to verify his claim that it has no effect on healthy subjects.

Hypnotism continues to attract no little attention, both in medical and other circles. Among physicians, Dr. Luys, our old acquaintance, remains more persuaded than ever of the efficacy of hypnotism, in its various branches, as a curative and therapeutic agent. Many are disposed to simply scoff at the doctrine as unworthy of discussion, and it must be confessed charlatans and self-deluded persons have thrown some discredit on hypnotism, but the standing and reputation of Dr. Luys, a member of the Academy of Medicine and a hospital physician, are such that, at least, respectful consideration must be paid to his opinions. At a recent meeting of the Hospitals' Medical Society he read the statistics of the patients treated during the year 1890 at the Charité Hospital by the various therapeutic methods derived from hypnotism,—namely, fascination, transfers and magnetic crowns combined with electricity. Out of one hundred and twenty-eight, there were sixty-seven considered cured, fifty-one improved, and ten unimproved. Hysterics make up the main portion of the patients,—that is, forty-nine; next in number are the paralytics. Epileptics were equally benefited, and so were patients suffering from neuralgias, writer's cramp, and various psychological troubles derived from cerebral overwork. As regards obstetric cases, women have been delivered without pain or danger by means of fascination with bright objects. It must be remarked that no medicine was administered at all during treatment; only epileptics were given prolonged baths, and debilitated patients tonics. Finally, according to the statistics, hypnotic methods applied to the treatment of nervous diseases, both acute and chronic, have cured fifty-two per cent. of the cases. So far so good. In practical life, however, hypnotism has not been quite a success. In a case now celebrated, and probably as familiar to the American as to the European reader,—that is to say, the Gouffé murder trial,—hypnotism was, for the first time, in a criminal case, set up as a defence for one of the prisoners. Michel Eyraud and Gabrielle Bompard, as you doubtless know, waylaid their victim and hanged him to death for the purpose of robbery, after which they escaped to America, where, for more than a year, they roamed over the continent between New York, Montreal, Vancouver, San Francisco, and Mexico, until they fell into the hands of the French police, Gabrielle by voluntary surrender, and Eyraud through being arrested in Havana by the local authorities. On their trial, the plea for the woman was that she had been hypnotized by Eyraud, and consequently was not responsible for her actions. A medical commission, composed of Drs. Brouardel, Molet, and Ballet, who had given Gabrielle a thorough examination while in prison, appeared for the state, and Dr. Sacreste and Professor Liégeois gave evidence for the defence. The report presented by Dr. Brouardel on behalf of the commission bore very hard on the prisoner. In a most lucid manner, Dr. Brouardel set forth the conclusions arrived at. "Gabrielle Bompard," he said, "is perfectly responsible for her doings; we found in her no trace of insanity. From her infancy, although her physical development has been somewhat anormal and irregular, there is nothing to show that her mental faculties have been in any way injured. Morally, she is altogether vicious, but intellectually she is decidedly bright, writes wonderfully well, has great facility of elocution, and enjoys remarkable memory. She is, no doubt, hysterical, and can easily be hypnotized, as we experienced with her consent, under the promise that the murder would not be alluded to. We remarked that even in the hypnotic state she kept full control of herself." In answer to a juryman, Dr. Brouardel replied that hypnotized subjects may be compelled to act against their will, but only in very simple actions. It is different, however, when complicated actions are concerned or when their innate feelings are shocked, as subjects never completely

lose consciousness. So at the Salpêtrière, two females, hypnotized, having been suggested to undress themselves and take a bath before several persons, one of them was going to obey without demur, and the other resisted and had a nervous attack. To which Dr. Ballet added: "No crime has ever been committed under the influence of hypnotic suggestion, and all the cases on record are what may be called laboratory crimes." Dr. Sacreste's evidence for the defence was of particular interest, because he knew the prisoner from her infancy. He said he hypnotized her many times, with her father's consent. He found her to be easily put to sleep. On one occasion it was for a dental operation, and she felt no pain therefrom. Another time, before company, he made her eat a raw potato, which, at his suggestion, she declared to be an excellent pear, and made her drink, under the name of champagne, some water, which made her tipsy. In his opinion, she could most easily have been hypnotized by Eyraud, and consequently be irresponsible for her share in the crime. Unfortunately, Dr. Sacreste was obliged to confess that when Gabrielle began to fall into bad ways, her father asked him to try hypnotism on her, but he utterly failed to improve her behavior. Professor Liégeois, who came next, is a professor at the Nancy Law School and one of the leaders of the new hypnotic doctrine. He made a very long speech, chiefly composed of examples and anecdotes, illustrating the vagaries which may be committed under hypnotic suggestions, and gave it as his firm opinion that Gabrielle had been entirely under Eyraud's influence, to which Dr. Brouardel replied that Eyraud's influence had merely been that observed between two persons living together, and that Gabrielle's influence on Eyraud was as great. The jury did not accept the theory for the defence. The verdict, which would have been one of acquittal had Gabrielle been irresponsible, was one of murder, with extenuating circumstances; that is the usual indulgence shown to a woman implicated in a crime with a man. The jury, in fact, "took no stock" in hypnotism. Eyraud was sentenced to death, and Gabrielle Bompard to twenty years' hard labor.

Poisoning accidents with chloride of barium are of rare occurrence, the salt not being much found outside of chemical laboratories. For this reason, and also owing to some interesting particulars, the following case deserves to be mentioned: A workman employed in a soap manufactory at Saint-Denis, near Paris, having been advised to take sulphate of magnesium, procured the first dose from the regular pharmacist. But for the second dose he applied to the chemist of the works, prevailing upon him to give him two ounces of a white salt taken from an old bottle in the laboratory, which was labelled "Sulphate of Magnesium." According to directions, he dissolved the two ounces in two tumblerfuls of water, and drank about one-third of the solution. He was almost immediately taken with violent vomiting, then with sanguinolent diarrhœa; and, the nature of the poison being at the time unknown,—in fact, it was thought to be oxalic acid,—the treatment was of no avail, and he died in a few hours. The post-mortem was made by Drs. Ogier and Socquet, who found by analysis that the death had been caused by the ingestion of about 20 grammes (5 drachms) of chloride of barium. The lungs were slightly congested; the heart cavities contained a little coagulated blood and thick liquid black blood; the stomach held 75 cubic centimetres (2½ ounces) of brownish liquid; the stomach mucous membrane, much swollen; kidneys congested; intestines, brain, and meninges unaltered. On analyzing the viscera, the important remark was made that out of the twenty grammes of barium chloride swallowed, barely ½ gramme (8 grains) in all could be found, most of the poison likely having been rejected during vomiting and purging. The repartition of the barium, either as chloride or sulphate, among the various viscera, was rather unexpected. The stomach and intestines, for instance, contrary to all provisions, contained no chloride, and merely traces of the sulphate. The liver, kidneys, lungs, and heart's blood held appreciable quantities of both chloride and sulphate of barium. There, again, expectations were at fault, as it was not thought possible that the chloride could escape being turned into sulphate before reaching these parts of the body. Without taking it for granted that this distribution of the poison be an absolute rule, it was noticed that the same proved to be the case with a dog purposely poisoned with 2 grammes (½ drachm) of chloride of barium. The animal, by the way, a 17-pound one, died in four hours, and presented precisely the same internal lesions above described. In a medico-legal point of view, it should not be lost sight of that a small quantity of barium chloride found in the stomach does not indicate a small amount of poison taken. Owing to the vomitings, it is most likely that, however large might have been the dose, but little will be found in the economy.

At the Society of Therapeutics meeting of January 14, pharmacist F. Vigier presented specimens of solutions of phosphorus in retinol, and gelatin capsules of the same. The preparations, made at Dr. Barthélemy's request, were still in perfect state of preservation, after a month's keeping. The process for making this solution, a most simple one, is as follows: The retinol is to be first heated to above 100° C. (212° F.), to dissipate all traces of moisture. Next it is introduced into a dry vial and allowed to cool; and, finally, one per cent. of dry, transparent phosphorus is dropped into the liquid. Gentle heating and shaking are all that is necessary to obtain a complete solution. Of course, all containers must, as much as possible, be kept full and always securely stoppered. Phosphorus being thus brought to the Society's notice in connection with retinol, Dr. Constantin Paul took occasion to call once more his fellow-members' attention to the dangers of the substance. "Phosphorus medication," he said, "is always dangerous, as the metalloid is apt to produce most sudden and unexpected effects, announced by no warning symptoms. For quite a while the patient may seem to remain unaffected by the treatment, when, all at once, alarming accidents will occur. It is, therefore, important to ever remain watchful, and it will be prudent to now and then suspend the medication, for a week at least.

At the Society of Dermatology and Syphilography, Dr. Fabret related a case of scarlet rash caused by opium and belladonna pills. The patient took one pill, containing five centigrammes of extract of opium and one centigramme of extract of belladonna. Two hours later he suffered from pruritus and heat, which lasted but a short time. A second pill having been taken, the same troubles reappeared somewhat aggravated, as they were followed by desquamation. At a later period the administration of opium alone brought on the same accidents.

Notes and Queries.

AN EXPERIMENTAL CRITICISM OF OUR KNOWLEDGE OF THE ACTION OF COCAINE.

Dr. U. Mosso (*Pflüger's Archiv*, 1890, Hft. 11 and 12, pp. 553–601) has published an exhaustive paper on cocaine, in which he collates the work of previous investigators, criticises it, and adds a number of experiments made by himself to prove and illustrate his arguments. The paper is too long even to abstract in detail, but his most important conclusions may be given, although many of them are simply confirmatory of previous work. 1. Cocaine in 10 per cent. solution applied to a mixed nerve paralyzes in an equal degree its motor and its sensory strands. 2. Cocaine given internally does not paralyze the terminations of sensory nerves, as curare does of motor nerves. Its action in diminishing general sensibility is chiefly due to an effect on the cells of the spinal cord. It is possible that when cocaine is administered by the stomach or subcutaneously it may diminish to an inappreciable extent the sensitiveness of the sensory end organs, but the amount circulating in the blood is too small to have any pronounced action. Locally applied, a 2 to 10 per cent. solution is necessary for the production of anæsthesia, and this strength can never be applied through the circulation, as it implies the administration of a much more than lethal dose. 3. Direct application of a solution to the medulla causes paralysis of the medullary centres. 4. In dogs doses of ½ milligramme per kilogramme of body weight had no effect on muscular contraction; 1 milligramme acted as a muscular stimulant, and 3 milligrammes acted as a muscular paralyzant. Experiments made on the isolated muscles of frogs and dogs gave similar results. 5. Its general anæsthetic action resembles in many respects that of chloroform or ether. Like them it acts as a protoplasm poison; like them, also, it first affects the psychical functions of the brain, and then sensitiveness to pain, which disappears first in the extremities, then in the trunk, and then in the cornea. 6. After its application the nerves are not injured, and return very speedily to an absolutely normal condition. Mosso also performed a number of exact experiments on himself to investigate the action of cocaine on muscle during its normal condition, during fasting, and during fatigue. These were made on the flexor muscle of the middle finger; muscular contraction was induced either voluntarily or by the interrupted current, and the finger was made to lift a weight of 2 kilogrammes. Tracings were taken in every case and carefully compared. While the author was in a perfectly normal condition he stimulated the muscle seven times per minute for fifteen minutes. He then rested until the muscle had quite recovered from its slight fatigue, and took 1½ grains of cocaine hydrochlorate by the mouth.

On again stimulating the muscle he found that its capacity for doing work was increased. The same dose injected directly into the arm diminished the working power of the muscle. Experiments of the same kind are given to show that the stimulant action is still more marked on muscles which have been tired out by previous work and are in a state of great fatigue. After fasting for forty-two hours he found that the working power of the muscle was very greatly diminished, but cocaine restored it to more than the normal for voluntary contraction, and to very nearly the normal when contraction was induced by electric stimulation. He found also that, after hard physical work with prolonged fasting, small doses of cocaine acted as a speedy restorative, and concludes that, apart from its action on the nervous system, it acts largely as a direct muscle stimulant. He found, also, that it lessened the physiological reaction time, that it increased the amount of air inspired, and that it contracted the blood vessels. For details on these and a number of other points the original paper had better be consulted.—*British Medical Journal*, December 6, 1890.

EHRLICH'S TEST IN TYPHOID FEVER.

It had long been known that when amido derivatives of the hydrocarbons of the benzene series are treated with nitrous acid, compounds are obtained which, owing to their extreme instability, and the readiness with which they enter into combination with an almost infinite number of other bodies, especially with aromatic compounds, have become of great practical as well as theoretical importance.

Particularly interesting is the fact that a very large number of our dyes are derived from these bodies. They were discovered by Peter Griess, and termed by him diazo compounds.

With the expectation of demonstrating by a color reaction some of the aromatic bodies, the existence of which in the urine had been rendered highly probable by the researches of Baumann and Brieger especially (*Zeitschrift f. Physiol. Chemie*, Bd. 3), Ehrlich undertook a series of carefully-conducted experiments in this direction.

A preliminary account of these investigations was published in the *Zeitschrift f. Klin. Med.*, Bd. 5, in 1882, which was followed by a more complete account of his results in the *Charité Annalen*, 8ter Jahrgang, in 1883.

The practical value of these, especially as regards their diagnostic importance in typhoid fever, has been the subject of much controversy, and it appears at the present day that the so-called Ehrlich's reaction is regarded by many as a medical curiosity of absolutely no diagnostic importance whatsoever; Petri and Penzoldt are the exponents of this side (Penzoldt, *Berl. Klin. Wochenschrift*, 1883, and Petri, *Zeitschrift für Klin. Med.*, 1884). The manner, however, in which these two observers entirely disregard the instructions given by Ehrlich, in order to insure success in the simple experiment, deprives their work of all value, for, as Ehrlich says, "there are but few tests in chemistry which cannot be spoiled by careless manipulation," (Ehrlich, *Deutsche Med. Wochenschrift*, 1883).

A great deal of confusion has also undoubtedly arisen from the fact that the exact color produced in the experiment has either been described improperly, or simply spoken of as the "characteristic reaction," a term conveying no idea whatsoever.

The original work of Ehrlich seems to be but little appreciated, and although we have in previous numbers of the GAZETTE described the application of his test for diagnostic purposes, we do not doubt that the concise directions for applying the test and the confirmatory evidence attained by DR. CHARLES E. SIMON and tabulated in a paper published in the *Johns Hopkins Hospital Bulletin* for November, 1890, will be acceptable to the readers of the GAZETTE.

Since the preparation of the chemically pure, crystalline diazo-compounds is quite a difficult process, Ehrlich made use of the fact that sulphanilic acid, when treated with nitrous acid in a nascent state, forms in solution the diazo-benzene-sulphonic acid, which thus becomes the active principle in the mixture employed.

The sulphanilic acid used for this purpose is the para-amido-benzene-sulphonic acid, prepared on a large scale, and used extensively in the coal-tar color industry.

Other compounds, of course, can also be used, as the meta-amido-benzene sulphonic acid, the ortho- and para-toluidine-sulphonic acids, and others, but among all these Ehrlich has found the common sulphanilic acid the most convenient.

Two solutions are employed and kept in separate bottles, the one containing 50 cc. of hydrochloric acid, which is diluted to 1000 cc. and saturated with sulphanilic acid, the other being a ½ per cent. solution of sodium nitrite.

To make the test, 40 cc. of the sulphanilic acid solution are taken in a measuring glass, and 1 cc. of the sodium nitrite solution added, the mixture being thoroughly agitated. The hydrochloric acid now acts upon the sodium nitrite, forming nitrous acid which, in a nascent state, forms the diazo-benzene-sulphonic acid by its action upon the sulphanilic acid. Small quantities of the sodium nitrite are used, and the absence of any free nitrous acid in the mixture is thus insured, and at the same time very small quantities of the diazo-benzene-sulphonic acid are formed,—one of the principal requirements, to insure success in the experiment.

The reaction which thus takes place is represented as follows:

$$\text{I. } NaNO_2 + HCl = NaCl + HNO_2$$

$$\text{II. } C_6H_4\begin{cases} NH_2 \\ SO_3H \end{cases} + HNO_2 = C_6H_4\begin{cases} N \\ SO_3 \end{cases}\!\!\gg N + 2H_2O.$$

Para-amido-benzene-sulphonic acid.
Diazo-benzene-sulphonic acid.

In his original article, Ehrlich advised the addition of this mixture to the urine to be tested, in the proportion of 1 : 1 per volume. If ammonia is added in excess to the urine thus treated, the color play, presently to be described, occurs. In a later communication (*Charité Annalen*, Bd. 11, 1886) he has modified this method by mixing one volume of urine with five to six volumes of absolute alcohol, previous to the addition of the sulphanilic acid mixture, filtering, and then adding the acid mixture to the filtrate.

Dr. Simon has found it convenient to add about 50 cc. of absolute alcohol to 10 cc. of urine, filtering and then running into the alcoholic urine, which has become more or less decolorized, the sulphanilic acid mixture from a burette; 20 cc. of the latter are then sufficient, added to about 30 cc. of the alcoholic urine; the addition of the acid in small quantities, for example, 2 cc. at a time, followed by thorough shaking of the urine, is at times advantageous, especially in typhoid fever, when the disease has advanced to a point at which the color reaction is no longer at its original intensity. By the addition of a few drops of ammonia to the final mixture, the characteristic color appears in typhoidal urine to disappear on shaking, and to become permanent after an excess of the ammonia has been added.

The author recommends a small Erlenmeyer's flask as more convenient for holding urine than the ordinary test-tube, the exact shade of color being more apparent by transmitted light. With this modified method most of Dr. Simon's experiments have been performed. There is, however, a third, which is more convenient, less expensive, and more delicate. A few cc. of urine are taken in a small test-tube, and an equal quantity of the sulphanilic acid mixture added, the whole being thoroughly agitated; 1 cc. of ammonia is then allowed to carefully run down the side of the tube, forming a colorless zone above the yellow urine, containing the acid; at the junction of the two a more or less deeply-colored ring will be seen, the color of which is readily distinguished and noted, the slightest carmine tint being made out more readily by its contrast with the colorless zone above, and the yellow below, than when we are dealing with a uniform color.

This simple modification occupies but a few minutes, and will be found especially convenient by the busy practitioner. As to the color-play which occurs in different kinds of urines, it will be observed that normal, or pathological, but non-febrile, urine remains either unaffected or its color is merely intensified by the addition of the ammonia; a deep orange tint may even be produced in this way, but has no significance whatsoever, and is easily enough distinguished from the typical color.

Ehrlich records one exception to this general rule,—that is, urine containing coloring-matters is changed to intense reddish-violet color. Dr. Simon also records another exception, which was that of a case whose urine contained a substance which reduced Fehling's solution but did not reduce the subnitrates of bismuth, and merely produced a black discoloration and in which the fermentation test failed completely. Undoubtedly this was one of the few cases in which glycuronic acid occurred normally in the urine. When Ehrlich's test was applied to this urine a dark-brown color developed, which, at the end of an hour, became almost black. In typhoid fever a color occurs upon the addition of ammonia, which may vary from an eosin to a deep garnet. Here Dr. Simon has found the second and third methods most useful, because with them the faintest rose tint is more readily perceived than when the first method is employed. If the first method be used and there be the slightest doubt as to the presence of the characteristic color which may occur in the latter stages of typhoid fever, a reaction may be said to be present when the foam which appears on shaking shows a reddish color, and especially

when upon standing for twelve to twenty-four hours the superficial layer of the sediment shows a green color.

That this reaction is not dependent upon the presence of any substance normally present in the urine Ehrlich seems to have established beyond a doubt, but as to the nature of the substance producing the reaction we have absolutely no knowledge. It is possible that a careful chemical study of the green sediment will lead to a clue as to the nature of this body, but this, of course, must be left to the hands of chemists.

Ehrlich has tested the urines of patients afflicted with almost every known disease, and has arrived at negative results, with some exceptions, typhoid fever, of course, being the most important and interesting. At times, however, he has met with the same in some of the morbilli, and diseases in general characterized by high fever, as in severe cases of phthisis pulmonalis, although it may occur in the latter in the absence of fever, but when present for some time he regards it a bad omen.

Dr. Simon then publishes notes of twenty-six cases in which this reaction was employed. From sixteen it was absent, while it failed in only four out of twenty-six typhoid fever cases, of which two were children, one a very mild case lasting but eleven days, and one was only tested on the sixteenth day of the disease, a time when the reaction is not always obtained and in fact is usually absent. The author summarizes his conclusions as follows:

1. The reaction may be obtained in cases of typhoid fever from the fifth to the thirteenth day without any difficulty with methods I. and II.

2. With method III. it may be observed as late as the twenty-second day, at a time when neither I. nor II. will yield absolute results.

3. Its absence from the fifth to the ninth day indicates a very mild case, excepting in children, although this rule is probably not an absolute one.

4. As it occurs previous to the appearance of the rash, it is a very useful aid in the diagnosis in typhoid fever.

STYRONE IN OTITIS MEDIA.

Dr. Cheltsoff strongly recommends the employment of a solution of styrone in chronic inflammation of the middle ear. Two forms of styrone exist, both, of course, having the same formula,—$C_9H_{10}O$; one consists of acicular crystals, melting at 33° C., and dissolving readily in ether and alcohol; the other—which is cheaper—is a yellowish liquid with an acrid taste, insoluble in water, but readily soluble in ether and alcohol. It is this latter form that Dr. Cheltsoff has used. He orders a solution of the strength of about a drachm to four ounces of spirit, of which from two to four teaspoonfuls are directed to be mixed with a tumbler of warm water for each syringing; the operation should be repeated two or three times a day. Styrone being both strongly disinfectant and deodorant as well as somewhat analgesic, the secretion soon diminishes and becomes less unpleasant, besides which, the pain, if present, is ameliorated. No irritation is produced as when many other substances are used in sufficiently strong solutions to destroy the micro-organisms present in the secretion.—*Lancet*, November 15, 1890.

COCOA-NUT AS A TÆNICIDE.

The statement published in the Gazette some time ago as to the tænicidal properties of cocoanut have been confirmed by a case reported by Dr. W. R. Allison in the *Peoria Medical Monthly* for November, 1889, in which the milk and meat of the cocoanut was taken by a patient, with the result of the expulsion of an entire tapeworm.

ADDISON'S DISEASE AND THE PARARENAL GLANDS.

Dr. Lancereaux (*Arch. Gén. de Méd.*, January, 1890) relates two cases in which the pararenal glands were the seat of tuberculous disease, the symptoms being weakness of the heart, quick pulse, gastric disturbance, and death by coma. In another case which he has seen, the pararenal glands were intact, while the skin was bronzed. He considers that the diseased condition of these glands in Addison's disease, when it is present, is the result of degeneration of the nerves.—*British Medical Journal*, December 6, 1890.

THE EFFECT OF AGE ON THE ABSORPTION OF DRUGS.

Dr. Yatsuty, having been struck by a remark of Professor Manasseïn on the influence of age on the rapidity of absorption of drugs, selected this subject for his M.D. thesis, which

has just been published. His experiments were conducted in the Zhitomir Municipal Hospital, of which he is medical officer, and were made on healthy male subjects of from 8 to over 80 years of age, the drugs experimented with being iodide of potassium and salicylate of sodium. The dose was made to depend upon the body-weight, a grain being allowed for each ten kilogrammes. Thus, a boy weighing twenty-five kilogrammes (fifty pounds) was given 2½ grains of iodide of potassium or salicylate of sodium, as the case might be, a man weighing fifty-five kilogrammes being given a 5½-grain dose. The drug was administered in a gelatin capsule, and the urine examined every three minutes in the case of both salts. With the iodide the saliva was also examined every two minutes. This was not done in the case of the salicylate, as in no case was any evidence of salicylic acid detected in the saliva. Dr. Yatsuty gives a tabular view of the experiments, the general result being that the younger the subject the more rapidly had absorption, as evidenced by testing the secretions, occurred. Thus, a boy of 9, weighing twenty-five kilogrammes, taking a dose of 2½ grains of iodide of potassium, generally gave the reaction in the urine in nineteen minutes; a man of 36, weighing sixty-six kilogrammes, and taking a dose of 6½ grains, showed no reaction in the urine until thirty-one minutes had elapsed; and a man of 76, of about the same weight, and taking the same dose, showed no reaction in the urine for thirty-seven minutes. Salicylate was absorbed in boys and young men in about fifteen minutes, while in middle-aged men it required about twenty minutes, and in old men about twenty-five minutes. There were some exceptional cases. Thus, some lads of 18 showed no iodide in the urine until thirty-one minutes; one man of 77 showed it in twenty-eight minutes; so that, although the average rapidity of absorption distinctly diminishes as age advances, it is not possible to say with certainty that a particular individual will absorb one of the drugs mentioned more rapidly than another who is a great deal older.—*Lancet*, January 10, 1891.

THE THERAPEUTIC ACTION OF CHLOROFORM INCORPORATED IN OINTMENT.

Chloroform is mostly employed by physicians in a mixture with oil. In making local application a great portion evaporates. Even when it is applied and protected with rubber cloth or wax paper, haste and care must be exercised if good results are to be accomplished. A precise, limited localization of the anæsthesia cannot be made by this means.

To mix the rapidly-evaporating chloroform with an ointment in a mortar is highly irrational. The greater the quantity of chloroform which is incorporated in an unctuous medium, the thinner and more rapidly disseminating does the ointment become, and the more illusive are localization with prolonged reaction rendered. To anticipate all this, the addition of wax in equal quantity by weight to the chloroform is essential, which should be remembered by the physician when prescribing. The mixture proportion—chloroform, 1 part; cera alba, 1 part; axungia, 3 parts—gives an ointment which gives excellent results in rheumatic local manifestations. Higher proportions—*e.g.*, chloroform, 17 parts; cera, 17 parts; axungia, 2 parts—react more energetically.

These ointments possess the following good properties: They retain the chloroform unchanged for three or four years; they can be spread with facility on old linen, muslin, etc.,—one-eighth of an inch is a layer of proper size,—and they slowly melt at body-heat, liberating the chloroform evenly and successively; lastly, they enable continuous local anæsthesia because of the limited direct application.

The preparation of the ointment is not difficult. The molten fluid, slightly cool mixture of cera and axungia, is poured into a glass jar or bottle, to which a glass stopper has been fitted so as to be perfectly air-tight. To this mixture the chloroform is added and the whole rapidly stirred with a spatula, after which it is allowed to harden. During the cooling process it must be shaken now and again to prevent the formation of unequal layers, tendency to which exists because of the greater specific gravity of the chloroform. —*Pittsburg Medical Review*, January, 1891.

TO REMOVE THE PIGMENTATIONS OF PREGNANCY.

In the *Journal de Médecine de Paris*, January 4, 1891, the following ointment is recommended to be rubbed into the affected parts twice daily to remove the pigmentations which so often disfigure pregnant women:

℞ Cocoa butter,
Castor oil, aa ℥ii¼;
Oxide of zinc, gr. v;
Yellow oxide of mercury, gr. ii;
Essence of roses, enough to perfume.